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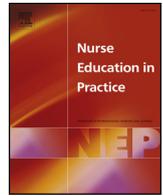
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Midwifery Education in Practice

Student midwives' perception of the growth assessment protocol (GAP): Preparation for clinical practice

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ABSTRACT

Fetal growth restriction is a major complication of pregnancy and increases the risk of stillbirth. Midwives screen for fetal wellbeing by measuring the symphysis fundal height to detect growth restriction, which can present in a low risk pregnancy or occur late in gestational age. The detection, surveillance and onward referral of these pregnancies are the responsibility of all midwives. To prevent avoidable stillbirth due to restricted fetal growth and to ensure safe, evidence based practice, the Perinatal Institute developed the Growth Assessment Protocol (GAP).

A qualitative study using semi-structured interviews was conducted to explore 2nd year student midwives' perception of the GAP training and its impact on their clinical practice. Data was analysed and four main themes were identified using interpretative phenomenological analysis.

The findings from the study show that the participants viewed the GAP training as 'authentic' and commented on the alignment with contemporary practice for the detection and surveillance of at risk pregnancies. The findings suggest that GAP training for pre-registration student midwives has the potential to provide a sustainable workforce, prepared to meet the World Health Organisation's global strategy for eliminating avoidable stillbirth by 2030.

1. Introduction and background

The Perinatal Institute (PI) is a United Kingdom (UK) national not-for-profit organisation which seeks to enhance the safety and quality of maternity care through standardised maternity records, fetal growth assessment and perinatal audit (PI, 2019a). This is firstly demonstrated through the combination of a Gestation Related Optimum Weight (GROW) computer software which calculates a customised chart of the expected fetal growth chart trajectory based individual maternal characteristics. Secondly, a Growth Assessment Protocol (GAP) training which aims to standardise clinical practice on measuring symphysis fundal height (SFH), demonstrate how to accurately plot fetal growth on a customised chart and therefore refer if restricted fetal growth is detected (PI, 2019b). An audit of the effectiveness of the GAP training Saving Babies in North England (SaBiNE) (2016) found there was a reduction in stillbirth and increased clinical confidence in detecting and referring at risk pregnancies.

The palpation of a pregnant woman's abdomen is an essential clinical midwifery skill, and is performed in the antenatal, intrapartum and

post-natal periods (Bharji and Henshaw, 2010). A systematic review of the predictability of detecting Small for Gestational Age (SGA) using a tape measure to record symphysis fundal height (SFH) in isolation to any ultrasound, was found to be unreliable and had a high false-negative rate (Pay et al., 2015; Robert et al., 2015). However, SFH measurement is an inexpensive and non-invasive way to monitor that fetal growth is within normal parameters (Johnson and Taylor, 2011).

Fetal growth restriction (FGR) is a term used to describe the failure in utero for the fetus to reach expected growth potential; this is thought to lead to an increase in perinatal morbidity and mortality (Carberry et al., 2014). SGA is best defined as an estimated fetal weight (EFW) or abdominal circumference (AC) at birth of below the 10th growth centile and severe SGA as being below the 3rd (Royal College of Obstetricians RCOG, 2014). The SGA fetus is not always synonymous with FGR, although the severe SGA fetus is at increased risk of perinatal mortality and morbidity (National Health Service, NHS, 2019). The detection of the pathological SGA fetus has gained recognition as a preventable precursor for still birth (Turner et al., 2016; Gardosi et al., 2013). Thus, pathological FGR increases the risk of morbidity and mortality making

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the surveillance of fetal growth in the antenatal period fundamental in detecting the 'at risk' fetus and initiating onward referral.

The ending of preventable or avoidable stillbirth by 2030 was endorsed by the 2014 World Health Assembly – The Every New-born Action Plan (ENAP), with a target of achieving 12 or fewer stillbirth per 1000 births by 2015; ninety four, mainly high middle-income countries, have achieved this target (Frøen et al., 2016). In 2016 stillbirth rates in England and Wales were 4.4 per 1,000 (Office for National Statistics ONS, 2018). The United Kingdom (UK) rate is below the ENAP target, yet comparable income countries such as Iceland and Finland have significantly lower rates of stillbirth; Iceland 1.3 per 1,000 and Finland 2.4 per 1,000 (NHS, 2016).

The NHS initiatives for 'Saving Babies Lives' care bundle version 1 and 2 collated evidenced base, focused initiatives to unify best practice (NHS, 2016; NHS, 2019). Of significance, was the inclusion of element 2: the risk assessment and surveillance for fetal growth restriction (NHS, 2016). Version 2 (NHS, 2019) called for a robust training programme and competency assessment for clinicians in screening for SGA by accurate SFH measuring, plotting and interpretation of growth charts.

There was a paucity of research or audits relating to the inclusion of student midwives' practice evaluating the effectiveness of the GAP training. The rationale for this study was therefore to explore student midwives' perception of GAP training and the impact this had on their understanding of the detection and surveillance of pathological SGA, in recognition, of the responsibility they will hold as registrants.

The objectives of this study:

1. To examine student midwives' understanding of the maternal risk factors for SGA and FGR in utero.
2. To explore student midwives' comprehension of the increased risk of stillbirth associated with the growth restricted fetus.
3. To determine the importance that student midwives' place on the detection and surveillance with regards to SGA in the context of clinical practice.

2. Methods

A research approach of interpretative phenomenology analysis (IPA) with hermeneutics was chosen to interpret student midwives' perceptions of the GAP training by seeking to explore their comprehension and context of this knowledge in clinical practice. The researcher is a clinical midwife and university lecturer in the subject of fetal growth assessment and embraced the interpretive nature of IPA by acknowledging and not 'bracketing out' prior knowledge and beliefs (Harvey and Land, 2017; Parahoo, 2017). Data was collected through open questions in line with IPA, with meaning coded through thematic analysis (Braun and Clarke, 2006; Parahoo, 2017). Ethical approval was sought and approved through the Faculty Ethics Committee, Faculty of Health and Human Sciences and Peninsular Schools of Medicine and Dentistry Student Ethics Committee. Additional ethical approval was not required, as the student midwives were not currently employed by the NHS or interviewed on NHS premises.

2.1. Participants

Participants who are eligible for this study were current 2nd year student midwives who had been provided with the GAP training in their 1st year clinical skills module. Invitations were sent out to the cohort of 55 students, with notification of the inclusion/exclusion criteria. The exclusion criteria excluded participants who had been pregnant, this prevented over 70% of the cohort being eligible. The 5 participants recruited contacted the researcher and were eligible for the study. Although a small sample size, this provided a good representation across the placement areas which encompassed both rural and urban areas. Throughout the study, all participants practiced in Trusts where

Table 1

Topic Guide
Maternal risk factors and how this affects management of fetal growth
Customised growth charts and plotting fundal height measurements
Clinical encounters where SGA pregnancies were under surveillance, detected or acted upon.
Changes to GAP training to enhance practice
Midwives perception of participant's GAP training/knowledge

the GROW and GAP programme was implemented. The midwife mentors had received this training either directly from the PI or cascaded via a designated practice development midwife. The study took place between September 2017 and August 2018.

2.2. Data collection

The semi-structured interviews with open questions took place on university premises and were face to face with the researcher. All participants were asked to sign a consent form before the interview took place and were informed that stored data would be anonymous and confidential which complies with European General Data Privacy Regulation of the Data Protection Act (2018) (Gov.UK, 2018). The duration of interviews ranged from 20 to 40 min and were digitally recorded with participant consent. A topic guide was used to reflect the qualitative IPA approach, providing flexibility to modify or add open questions as themes emerged (Harvey and Land, 2017), see Table 1.

2.3. Data analysis

The recorded interviews were reviewed digitally and transcribed verbatim. The interview scripts were uploaded to the software package NVIVO11 to aid with the sorting and storage of the data. Field notes documented by the researcher at the time of the interview aided the interpretative nature of the analysis to capture the 'lived experience' of the participants (Moule et al, 2017). In fitting with the hermeneutic aspect of IPA careful transcribing of speech connotations, pauses and kinetic descriptions or emphases were documented and aided analysis (Parahoo, 2017). An audit trail and coding methodology was made available (Harvey and Land, 2017). Initial coding was completed independently by the researcher with a designated sample check inter-coded by the second researcher to increase reliability and credibility (Polit and Beck, 2018). The four themes were constantly refined to ensure they were distinct from each other but also firmly rooted in evidence or 'voice', of the participants (Pringle et al., 2011).

3. Findings

The findings are described in 4 overarching themes with sub-themes - see Table 2.

Theme 1: GAP and GROW – knowledge recalled

The associated sub-themes were interpreted to demonstrate knowledge recalled by analysing the participant's responses detailing key fundamental practices of GAP and GROW. GAP proposes to standardise the measuring of the maternal SFH to reduced clinician subjectivity.

'You showed us how to do a fundal height and how we do it all effectively in the standardised way and the way that all midwives now do it' (Participant C).

'You do it with the tape measure upside down with a paper tape measure (Participant A)

The act of actually doing the actual measuring, how important it is to be

Table 2
Identification of themes

Theme 1	Sub theme 1	Sub theme 2	Subtheme 3	Subtheme 4
GAP and GROW – Knowledge Recalled				
	Standardised practice	SGA and maternal risk factors	Customised GROW charts	Knowledge of GAP demonstrated
Theme 2 Growing Confidence – Feeling Prepared	Relevance of rationale	Prepared for clinical practice	Applying clinical skills and asking questions	
Theme 3 GAP and GROW in clinical practice –The Realities	Expectations from midwives	Challenges in practice	Clarity in practice	
Theme 4 Improvements in training – Looking Forward	Revisit and expand	Simulation challenges		

precise, you know, use a non-stretchy tape, have it face down, start at the fundus right down to the top of the symphysis pubis and just ensuring that it is flat and not sort of gathered at all (Participant E).

There was a recall of knowledge which acknowledged the maternal risk factors associated with the SGA fetus and the impact this had on a pregnancy. *‘I know that if we have a woman who smokes a lot or had a previous SGA baby then they definitely have scans’ (Participant B).*

I’ve looked after smokers with SGA babies and all their babies have been below the 10th and yeah, quite common really (Participant E).

There were some responses which highlighted their recall of the rationale for customised GROW charts.

We generate one at booking, we take their height, weight, their parity, their ethnicity’ (Participant E). ‘Then you want a curve that is in line with really with the other curves on the chart, so you want it a nice steady growth over the weeks you take the measurements. (Participant E).

‘if it falls from that curve then the community midwife should refer them for a growth scan’ (Participant D)

There was a subtle difference within the analysis of this sub-theme; participants were synthesising the learning gained during the GAP training and practice, constructing examples and applying across the pregnancy continuum.

‘baby was detected as under the 10th centile just, so was induced at 37 weeks, actually I think she was induced at term because it had been growing fine’ (Participant E). Participant E further demonstrated application of the GAP knowledge by recounting an otherwise ‘normal’ previous obstetric history which became complicated by the detection of FGR in this pregnancy: *‘It had been growing fine, nearer term, growth was below the 10th centile. She was induced, she’d had 3 previous normal deliveries, one homebirth at 41 weeks, so she tended to go over. She was induced and baby did come it was below the 10th centile but above the 5th, I think it was the 7th’ (Participant E).*

(Participant C) ‘GROW starts really early on when you are looking at all the maternal risk factors but actually it goes through the whole pregnancy and postnatally’

Theme 2 – Growing Confidence – Feeling prepared

The participants were able to demonstrate a relevance of the rationale for the application of the GAP/GROW in reducing avoidable stillbirth through detection of fetal growth restriction. *(Participant B) ‘babies are born small but they are still safe because the right action had been taken to make sure they are safe’.* This rationale was succinctly summarised *‘people are still going home with their babies, as that is the main goal isn’t it really?’ (Participant B).*

Feeling prepared and able to participate in clinical practice was of importance for the student midwives. This ability to participate in an authentic antenatal clinical skill such as SFH measurement and plotting allowed the participants to feel useful, prepared and speaking the same GROW ‘language’ as the midwives were.

‘when somebody says “where’s the fundus?” Only a midwife would know where the fundus was!’ (Participant C)

‘The main thing I remember is the graph’ (Participant A). There was a sense of ‘familiarisation’ with the GROW chart among the otherwise unfamiliar antenatal perinatal notes ‘you open up all these notes, which are ‘alien’ to you, but you open up this one page and you know how to do that bit...’ (Participant A).

There was a demonstration of clinical reasoning skills, application of knowledge regarding management and ongoing care. *‘Because just plotting it on GROW is one thing but knowing if you need to send them for a GTT or a scan or if they are already on serial scans do you need to send them for another scan?’ (Participant C). If the growth suddenly dropped can you wait a week? Or do you need to send them today?’ (Participant C).*

Theme 3: GAP and GROW in clinical practice – The Realities

It was useful to have insight to the realities of what the student midwives were experiencing and what they were expected to know before entering practice. For some there was an expectation from the midwives that the skill of SFH measurement would have been taught in the university before commencing practice. *‘The impression I get it’s like they expect me to know what it is’ (Participant B).* Some midwives presumed that the participants had received the GAP training and therefore were able to apply the principles and clinical skills already, even early in their training: *‘Nobody made particular comments about it, it has just become such common thing in practice that it is just part of what we do’ (Participant C).* Midwives were complimentary on how the participants had acquired the GAP training during their undergraduate training *‘one of the midwives, just said that she didn’t have that in her training, she got taught it after and she thought it was really good that we sort of knew how to do it and the reasons behind it as well’ (Participant D).*

Further sub-themes emerging were areas of clarity and challenges in practice. There were examples when the GAP training aligned with clinical practice and episodes of where there was incongruence with the taught theory and application of practice *‘You don’t always see it done in practice very often the correct way, like only one measurement and people also have their own tape measures (Participant A). Lots of people, I notice, don’t turn their tape measure over and will do it again’ (Participant B).* Some variances in practice confused the participants and made it difficult for the participants to apply the principles of GAP. *‘So many*

people will go back and retry it and the whole point is to not but take your first one and go with that' (Participant A).

Or despite knowing the principles of standardised practice, the midwives did not change their practice 'Only one or two have done it totally opposite, they actually openly said to me beforehand "I know that you are doing it differently so do what you have been taught" (Participant E).

Notwithstanding the challenges in practice, there were some responses that very much underpinned the theoretical aspect of GROW/GAP. The participants recounted clinical situations where FGR was detected and acted upon including observing ultrasound scans 'I saw quite a couple of growth scans where they did detect SGA' (Participant A). In addition, gave examples of successes from practice of when an 'at risk' fetus was identified with a clear referral pathway and managed appropriately in the antenatal period. Participants identified this as 'clarity in practice' as it corresponded with what they knew from the GAP training and readily initiated by the midwifery mentors. 'We have a little flow chart which shows the pathway you have to do for a baby under the 10th centile or a baby under the 5th centile' (Participant A).

'If babies are instantly below the bottom centile when you do the first measurement then they are straight away referred for a growth scan (Participant B).

'It was picked up by the community midwife in clinic. Yeah she said "the growth is the same", so then they sent her in for a scan and they were like yeah it is the same' (Participant D).

3.1. Theme 4 Improvements in training – looking forward

The participants commented that there were challenges to practicing such an intrinsic clinical skill such as SFH measurement, on a simulated abdominal manikin 'the models. They are just so difficult!' (Participant A). Some participants commented that the theoretical aspect of the GAP should be revisited to keep them contemporary in knowledge at the point of registration as midwives. 'I think more discussion around when we refer! I remember writing the different scenarios and you would say "when do you refer for a scan?"' (Participant E).

'GROW will probably still be a programme which continues to develop and beyond 1st year of being a student midwife (Participant C).

4. Discussion

4.1. GAP and GROW knowledge recalled

The recognition of maternal risk factors for SGA, the standardised practice of SFH measurement and the accurate plotting on a customised GROW charts are central to the GAP training (Clifford et al., 2013; Morse et al., 2009). Maternal risk factors for SGA and fetal growth restriction is well documented in the literature and have been incorporated into national guidance (NHS, 2016; NHS, 2019; RCOG, 2014; Williams et al., 2017).

The participants gave examples from practice to demonstrate the impact of pre-existing maternal/fetal risk factors had on the initiation of care pathways. Linking knowledge and meaning are referred to as being a 'constructive' learner in both theoretical and practical social environments (Light et al., 2014). This social construction of knowledge, situated in their 'communities of practice' (Lave and Wenger, 2011) enabled the participants to apply practice examples to aid recall and knowledge.

The use of a customised rather than a population based fetal growth chart such as Inter-Growth 21 (IG21) continues to be debated among researchers as to which is the most sensitive to detecting SGA (Figueras et al., 2007; Francis et al., 2018; Villar et al., 2013; Gardosi, 1999). Maternal 'ethnicity' and the associated social deprivation for these populations in the UK are not represented in the ethnic populations by

IG21 leading Gardosi et al. (2018) to cite the 'one size does not fit all' concept. In contrast, Villar et al. (2013) critique their populations as being globally multi-ethnic and healthy, rather than derived from UK data sets of 'local populations'. A Cochrane review by Carberry et al. (2014) concluded that the increased detection rate of SGA may be because of policy change, rather than the inclusion solely of plotting on a customised chart. Jayawardanan and Sheehan (2018) Australian study, conclude that whilst the influence of a protocol change cannot be extrapolated, they suggest the customisation of the growth charts shows increased sensitivity to detecting SGA in their multi-ethnic population following the GAP implementation in 2015. Cowan (et al., 2019) concur in terms of the high obesity and multi-ethnic New Zealand population, they were 4 times more likely to have SGA detected following implementation of GAP.

Reducing stillbirth remains multifactorial, screening for fetal growth restricted using SFH alone, even on low risk women, should not be considered in isolation (Robert et al., 2015). However, since the GAP has been implemented, stillbirth rates have decreased (Williams et al., 2017; Turner et al., 2016; Gardosi et al., 2013). The GAP training has been rolled out from the original base in the West Midlands to other UK Trusts and by the end of 2019, GAP was in use in 78% of Trusts and Health Boards in the UK (PI, 2019d). A further global rollout of GAP is planned in the Netherlands, New Zealand, Australia and India (PI, 2019c).

The student's responses demonstrated their knowledge of why a customised chart is generated based on maternal demographics and what constituted normal fetal growth trajectory. The woman's ethnicity, smoking status and previous fetal growth restriction were common factors recalled. This reflects the literature which argues that maternal ethnicity and social deprivation will have an impact on the growth of a fetus (Francis et al., 2018). The participants were recalling knowledge directly with the GAP training, however, this knowledge could be applied to population based charts.

The participants were able to apply the GAP training as principles previously discussed. This was a unique opportunity to identify how the participants saw and represented the knowledge. Biggs and Tang (2011) discuss a conceptual change in moving from simple to complex; how the learner 'sees' the world. The ease that participants applied recall of knowledge with examples from practice (social reality) demonstrated understanding in the clinical context, not a passive but active knowledge acquisition. They were beginning to think of themselves as 'midwives'.

4.2. Growing Confidence – feeling prepared

This study sought to provide authentic and practice centred training to student midwives; to challenge the argument of disassociated theory and practice gap (Factor et al., 2017). Despite this 'gap' being well researched in preparing participants for practice, Monaghan (2015) concluded that participants were still reporting feeling unprepared during undergraduate training in clinical skills. In attempting to close this gap, midwifery teachers or lecturers should find opportunities to link theory with practice. Being 'immersed in practice' has shown to have a positive impact on student learning in both university and practice settings (Fraser et al., 2013).

Skill acquisition and knowledge are taught within a theoretical context but the competence in clinical skill acquisition can be extended and developed in practice within authentic 'communities of practice' known as 'situated learning theory' (Lave and Wenger (2011)). The participants demonstrated their knowledge of the rationale for GAP and refinement of this theoretical and clinical skill had formed a theoretical base for them to construct or to 'scaffold' onto future learning and understanding (Lave and Wenger, 2011). The transfer of learning in practice, from newly acquired clinical skills requires time, reflection and discussion in a socially constructed and authentic community (Dent and Harden, 2013; Joseph and Jwah, 2012). This study demonstrated

that the additional year of practice, after the initial GAP training, consolidated the participant's knowledge and skill acquisition in an authentic and potentially complex clinical environment.

4.3. Realities of practice

In preparing participants for clinical practice and teaching GAP and GROW, the findings suggest there was some 'clarity' but also some 'challenges' to practice.

The PI acknowledged that there were varying practices in measuring SFH, insufficient awareness of the importance of fetal growth, lack of protocols and clinical confidence in onward referral for USS (Gardosi et al., 2013). One of the key functions of the GAP training to ensure that all clinicians are following the same standardised practice to ensure equity and minimise subjectivity (Clifford et al., 2013).

Findings following an audit of SGA classification 'at birth' reported that 18.8% of neonates were categorised as low risk antenatally did not receive an ultrasound; more worryingly, 17.7% who were high risk antenatally, still were not referred for serial ultrasounds as per protocol (Williams et al., 2017). In seeking to explain this non-referral for high risk women, Williams et al. (2017) suggest that the availability of sonographers may have had an impact, rather than the midwives not following the protocol.

The findings also suggest that there was some clarity in practice; teaching on the GAP training day reflected the clinical application in practice. This offers assurance that the GAP training aligned with practice whilst maintaining a 'real world truth'.

The participants observed midwives who followed the GAP and referred for where appropriate. This 'role modelling' of midwives as autonomous practitioners is crucial to ensuring that student midwives are safe to follow their lead (Bluff and Holloway, 2008). Fetal growth restriction is considered a 'deviation from the norm' and therefore onward referral to the multidisciplinary team to 'practise effectively' is within the professional aspects of midwifery (NMC, 2018). However, in emulating the findings from the SaBiNE audit (2016) following the GAP implementation, midwives reported increased confidence in their own competence, in detecting pathological SGA, whilst not increasing the false-positive referral rate. This was interpreted as giving 'clarity' to the participants through being positive role models for autonomy and professional accountability.

4.4. Improvements – looking forward

Teaching that has been constructively aligned to a curriculum such as nursing or midwifery, can increase confidence in practical skill acquisition (Joseph and Jwah, 2012; Biggs and Tang, 2011). However, there must be a commitment to reflecting the competences required in any new midwifery curriculum. When teaching a clinical skill the concept of practice being 'modelled' by the teacher as the 'primary socialiser' encourages confidence in attempting the new skill and adds to a deeper level of learning and skill acquisition (Dow, 2012). The GAP training is more than just skill acquisition of SFH and plotting on a customised chart, it is to reduce avoidable stillbirth through the detection and surveillance of SFH measurements (Clifford et al., 2013; Morse, 2009).

Of interest and pertinent, as a midwifery lecturer, was the emerging concepts of 'revisit' and 'expand' which were presented in the findings. Some participants felt a GAP/GROW refresher session with the opportunity to discuss complex scenarios would be of benefit. These findings lend themselves to the introduction of the GAP training as a component of a 'spiral curriculum', said to improve knowledge and skill acquisition (Dent and Harden, 2013). This affords participants the opportunity to consolidate learning upon revising topics throughout their programme, whilst increasing the level of complexity in preparation for registration (Coelho and Moles, 2015). The revisiting of a topic aligns similarly in practice, through the aspects of mandatory training requirements, so

ensuring clinicians are contemporary in clinical skills and evidence base.

4.5. Strengths and limitations of the study

This study demonstrates that the GAP training prepares students with the knowledge and skills for future practice. Teaching GAP in the pre-registration curriculum provides maternity services with a sustainable source of midwives trained in the recognition and continued commitment to the reduction of avoidable stillbirth.

The size of the study limits representation of the findings to other HEIs delivering pre-registration midwifery programmes.

4.6. Implications and recommendations for policy and practice

In designing a curriculum that continues to stay contemporary and align with practice, Carson and Carnwell (2007) urge educators to 'keep pace' with the changing practice landscape. Also to ensure that the curriculum is innovative and embedded in practice, to best prepare students to embrace changes to practice, that will most likely occur during their careers (Boore and Deeny, 2012).

5. Conclusion

The GAP training provides teaching for student midwives which is authentic and aligns with current clinical practice. If taught at undergraduate level it ensures that maternity services have newly qualified midwives who are able to risk assess and provide antenatal surveillance and detection for all pregnancies. Completion of the GAP training by student midwives evidences the required skills competence proposed for the future midwife. Furthermore, this ensures that staff are trained to perform SFH measurements effectively, undertaking risk assessment, prevention and surveillance of pregnancies.

This study concludes that teaching the GAP to all student midwives at undergraduate level not only provides a sustainable workforce who are fit for purpose; it further equips them with clinical reasoning and skill acquisition to respond to the dynamic and complex clinical environment.

Declaration of competing Interest

I declare I have no conflict of interest in this study.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.nepr.2020.102756>.

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