Midwifery experiences in rural Southern Aotearoa New Zealand: insights into pre-eclampsia management

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ABSTRACT

AIM: This study investigated the experiences of rural midwives in the Southern region of Aotearoa New Zealand, focussing on practices and challenges in caring for pregnant individuals displaying signs of pre-eclampsia (PE).

METHOD: Conducted as part of the University of Otago's Trainee Intern Healthcare Evaluation Project, investigating the efficacy of the soluble FMS-like tyrosine kinase 1 (sFlt-1)/placental growth factor (PlGF) ratio test, this exploratory study employed qualitative research methods. Twenty-three midwives from nine locations across the Southern region were interviewed by trainee intern doctors (TIs) using a semi-structured interview protocol. Thematic analysis was applied to the data.

RESULTS: The study highlighted the challenging context of rural midwifery, emphasising diverse working conditions, geographic complexities and the impact of the midwifery shortage. Midwives' decision making about PE depended on location, experience, scientific evidence, holistic model of care and the constant concern about PE. A model illustrating midwifery decision making in PE management was developed.

CONCLUSION: Rural midwives in Aotearoa New Zealand's Southern region managing PE cases face complex challenges. The model derived from this study illustrates the delicate balance that rural midwives navigate, emphasising the need for strategies to support their practice and preserve Aotearoa New Zealand's distinctive maternity care model.

Pre-eclampsia (PE) is a serious medical condition of pregnancy affecting approximately 3–8% of pregnancies, and is associated with significant maternal and fetal morbidity and mortality.[1–5] It is a progressive multisystem disorder characterised by new onset of hypertension and evidence of organ damage—including renal or liver insufficiency—haematological complications, neurological symptoms and evidence of uteroplacental dysfunction such as fetal growth restriction.[1,2] Although understanding of this heterogeneous syndrome has improved, the pathogenesis remains uncertain, with research focussing on the pro-angiogenic placental growth factor (PlGF), anti-angiogenic factor soluble FMS-like tyrosine kinase 1 (sFlt-1) and vascular endothelial growth factor (VEGF).[5–8] The sFlt-1/PlGF ratio test is internationally recognised for confidently excluding PE in pregnant individuals of at least 20 weeks gestation with symptoms of PE for at least 1 week following testing.[7–9] Preliminary Aotearoa New Zealand research supports its applicability and comparable performance, suggesting its use may aid risk stratification in suspected PE.[10]

Practitioner and patient education along with guidelines and protocols inform the management of PE; however, assessing risk and decision-making demands considerable clinical judgment.[2,11–13] Aotearoa New Zealand's unique model of maternity care, funded by the Ministry of Health – Manatū Hauora, is centred around the principles of partnership and the provision of continuity of holistic care.[14,15] Lead maternity carers (LMCs), primarily midwives, are the main maternity providers, responsible for assessing needs, planning and coordinating care from early pregnancy until 6 weeks post-birth.[16,17]

This article explores the experiences of rural midwives caring for pregnant individuals with symptoms of PE in the Southern region of Te Waipounamu South Island, Aotearoa New Zealand. The aim of this study was to assess the efficacy of introducing the sFlt-1/PlGF ratio test for PE risk evaluation in the Southern region.[18]

Methods

This exploratory qualitative study, conducted by trainee interns (TIs) under the supervision of the first author, addresses interest in understanding rural midwives' perspectives on implementing the sFlt-1/PlGF ratio test in the Southern region of Aotearoa New Zealand. As part of their training, groups of TIs undertake a supervised 6-week research project in collaboration with a client (in this case, an obstetrician and obstetric registrar).[18] Ethical approval was obtained from the University of Otago Human Ethics Committee (Ref 23/073). Using purposeful and snowball strategies, 54 rural midwives practising in the Southern district were identified and 49 were able to be contacted via email and/or telephone. Twenty-three (47% of those contacted) from nine locations were recruited and allocated code names linked to their location. TIs conducted interviews via Zoom (six), telephone (16), and one in person, employing a semi-structured, open-ended interview protocol developed collaboratively with the supervisor, an obstetrician and an obstetric registrar. The interviews, lasting 10–32 minutes (mean=21), focussed on midwives' practices for managing clients with PE symptoms and knowledge of the sFlt-1/PlGF ratio test. Interviews were recorded, transcribed and initially coded by multiple TIs using descriptive thematic analysis. Subsequent analysis involved the first four authors employing an inductive brainstorming approach to identify themes related to procedures, processes and understandings of Southern rural midwives who worked with clients exhibiting symptoms of PE.[19,20]

Results

Participant demographic characteristics are summarised in Table 1. Most interviewees were Aotearoa New Zealand-trained, full-time LMCs, although many had experience in other roles, including as core midwives and managers. Midwifery experience ranged from 1 to 39 years (mean=13), with most midwives caring for an average of four to six clients per month.

1. The challenging context of rural midwives' work

Southern rural midwives encountered diverse working conditions but shared common characteristics as skilled professionals whose clinical judgment in a unique, complex and often isolated environment was pivotal for those in their care. The region's broad geography made secondary and tertiary services within an hour's drive or several hours away (up to 300 kilometres from a hospital), depending on where their client lived. Pregnant individuals with PE signs or symptoms frequently were required to travel to these centres for monitoring. As one midwife explained:

> *Sometimes the complexities of being a rural midwife and caring for women who needed to access that secondary/ tertiary care, with which we had a great relationship with our base hospital … but we did manage probably a lot rurally already for women who needed that extra surveillance and assessment. So, we did a lot of that before our women actually got to Dunedin. (B2)*

Challenges in the rural context were exacerbated by factors like economic pressures on families, variable laboratory facility access and distance-related logistics. When discussing managing clients with symptoms of PE, one midwife remarked, "*It sometimes just depended on also where I was, where they lived, and the time of the day*" (A4). Blood analyses not available locally required transport to larger, distant laboratories, which was to be the case for the sFlt-1/PlGF ratio test. Access to laboratory services varied considerably across the region, with some having access to relatively close laboratories that could conduct most of the required tests, through to those who were reliant on getting samples to a regional general practice for a twice-daily courier pickup to then be delivered to the laboratory in Dunedin. In most areas, courier services were not available on weekends. Fluctuations with courier services and access to testing and analysis facilities contributed to other challenges, such as blood samples going missing or failing to reach the correct destination, especially on weekends: "*But there was always some sort of hiccup with couriers and things on the weekends.*" (I2)

Birthing units were unavailable in most centres and rural units lacked antenatal capability for regular monitoring. Midwives assessed risk, gestation, distance to secondary or tertiary hospitals and weather conditions that could make helicopter or car trips treacherous. The vast distance and challenging terrain were not always understood by urban colleagues. Midwives recounted doctors suggesting clients "drop in" to see an obstetrician or

Table 1: Demographics of participants.

Characteristics	Number of participants n=23
District hub location	
Central & Clutha District	8
Queenstown-Lakes District	7
Waitaki & Southland District	8
Current role	
Lead maternity carer (employed or independent)	20
Core midwife	1
Primary unit manager	2
Employment	
Full-time	22
Part-time	1
Midwifery training	
Bachelor of Midwifery	17
Diploma of Midwifery	1
Overseas	1
Unknown	4
Years of midwifery experience	
<5 years	5
5–9 years	4
10–15 years	6
16–20 years	1
20+ years	6
Unknown	1
Years of rural midwifery experience	
<5 years	7
5–9 years	6
10–15 years	4
16–20 years	1
20+ years	4
Unknown	1

Table 1 (continued): Demographics of participants.

Average number of clients per month	
N/A to core & managerial midwifery roles	3
1–3	3
4–6	12
7–10	5

advising midwives to increase monitoring.

Even if you've got a locum, or a new registrar from up north or somewhere they might know where our location is, but they don't understand what services we can provide. (Q1)

They might ask that we keep an eye on her, but we're like, "Hey look we're under-resourced up here. We can't keep checking bloods, there's no quick time frame." So generally, we have a very low threshold to getting women out of the region. (W2)

Midwives described the stress of their work, exacerbated by the midwifery workforce shortage, which has disproportionately affected rural areas.[21] In response, various employment arrangements, workarounds and new local systems were adopted. Employment and partnership arrangements varied, with several mentioning recent or anticipated changes in their work.

We've been self-employed midwives, but we're turning into a team employed by Te Whatu Ora. (W1)

Te Whatu Ora Southern have employed four of us to look after the women in the area antenatally during labour and birth if they want to birth locally, and postnatally, but not travelling through to the base hospitals to provide their labour and birth care. (A2)

I work with one other midwife and we used to have our own clients and we now have a shared caseload. (A5)

To address limited laboratory facilities and courier services, midwives described transporting blood samples to laboratories themselves or getting the client/family to do so. Some locations had recent or proposed improvements, such as one centre's capability to perform a protein creatinine ratio test, another processing urgent after-hours blood tests and a growing rural centre establishing a birthing unit with postnatal beds.

New local interventions were intended to alleviate pressure on rural midwives in the long term, but their initial implementation was stressful and often added extra challenges, among which midwives provided continual care and support, sometimes without compensation:

We still find about 50% of our caseload won't birth in this area. They go to the city, which is why midwives who want the equivalent of a full-time job all carry quite a big caseload because we lose a lot of the income attached to the birth fee if a woman has to birth in the city. (W4)

Moreover, it was noted that while the rural maternity healthcare sector is particularly under stress, the entire healthcare system in Aotearoa New Zealand was stretched almost beyond capacity.[22] As one midwife pointed out:

I guess it's the same as all the health system in New Zealand. It's all a bit broken at the moment, isn't it? (Wi1)

2. Tests and evidence to guide decision making

Rural midwives expressed enthusiasm for learning about tests or interventions to identify PE. Their practice was evidence based, utilising standard tests, examinations and observations to inform decision making. One midwife described using empirical and observational information to guide decisions:

I do PE screen, liver function, kidney function and do a urine PCR. So that would be my normal practice if the blood pressure is high … to do those tests first and then only refer to the consultants if those tests were abnormal. Or if the blood pressure got above 150. If they're abnormal, [I'd do a] *PE screen and I'd just monitor them regularly, get growth scans and things. So, I tend to monitor that mild sort of pre-PE myself, and then refer once I get more confirmed diagnosis. (I1)*

Midwives adhered to standard guidelines for monitoring and managing clients with suspected PE, with one midwife noting, "*We don't practice in the grey*" (B1). They had a clear awareness of their scope of practice and handed over responsibility to the obstetricians when necessary:

From our point of view, it's quite straightforward, and if the obstetricians want any further testing done, that's done through them after we consult. (G1)

If it meets the referral guidelines, I would do a phone consult to the obstetric team. (Wi2)

Midwives expressed a desire for more information on the sFlt-1/PlGF ratio test's accuracy, physiology and scientific basis, seeking reassurance about its reliability while acknowledging the importance of obstetricians' support for new tests:

We kind of rely on the advice from the obstetric team. If they could tell us how this would benefit the woman and they were comfortable doing this instead of our current process, then we would be happy to go along with that. (O1)

Midwives were committed to integrating new assessment tools into their practice, providing they were evidence based and applicable in their context. Midwives acknowledged that it was challenging to find time to undergo professional development, and few had heard about the sFlt-1/PlGF ratio test prior to this research. However, all described preferences for ways to increase their knowledge and education about the test if it were deemed useful for their practice. Many suggested practical education sessions, preferably locally. Others preferred being able to access information in their own time via recordings. Most also requested user-friendly information resources to share with their clients.

Despite their general enthusiasm and theoretical support for the sFlt-1/PlGF ratio test, some of the participants identified their concerns about the efficacy of the test in the rural context. The potential benefits of the sFlt-1/PlGF ratio test to eliminate imminent risk of PE and reduce hospitalisations were compromised by logistical barriers, particularly the need to send tests to Dunedin:

So that concerns me that it [analysis] *would be Dunedin-based. It is a time-sensitive issue because you can go from being borderline blood pressure to high quite quickly. (A4)*

If the idea is to keep women in their areas, then the test needs to be in the area, so that's actually a dealbreaker. (O2)

Nevertheless, participants were supportive of any measures that could be part of the toolkit to improve the care for their clients and, despite the logistical challenges of timing noted above, several discussed different ways that they could envisage the test being used effectively. One suggestion, which has been successfully implemented since the research was completed, was that the test might have utility for those being monitored in a secondary hospital, if it were used to inform the decision whether to return the pregnant person to the rural setting:

There's still a benefit for women who we may not be comfortable keeping up here. If she did end up down in Dunedin, and could have this test done, then it might buy her 6 days at home. If she's had an assessment by the Obs and Gynae team it may be enough to send her back home for the next week. (W4)

3. Midwifery model of care

Aligned with the midwifery philosophy in Aotearoa New Zealand, these midwives aimed to work in partnership holistically with their clients and whānau to support normal birth.[17] This commitment was evident in the way midwives described cultivating reciprocal client

relationships. Midwives educated clients and their families about PE and encouraged self-monitoring to recognise symptoms and when to contact their midwives. Midwives were concerned about disruption to family wellbeing if clients required transfer to a secondary or tertiary facility:

> *Say the woman lives in* [rural area], *it will take her 2½ hours by the time she gets in her car to get there, but she hasn't come to the appointment, thinking that that's what she has to do. So, then she has to go home, get all her gear, sort out her family. There's a whole lot of stuff there that that woman has to organise to be able to go over… Like, it doesn't impact on me—other than having to tell the woman that she has to go to Dunedin, and that's disruptive for her family. But it's really disruptive for rural woman to have to do that and their families. (A2)*

Midwives noted that extended travel time could compromise the potential for a natural birth. If clients gave birth in a secondary or tertiary facility, their rural LMC was typically unable to be present. While keen to avoid these disruptions, midwives were also cautious about indicators of PE. When evidence suggested a pregnancy was at risk, midwives sought guidance from the obstetric team. One midwife explained that the holistic midwifery philosophy involved client advocacy and underpinned their decision making and practice:

> *There could be a difference between each midwife and how they do that* [PE] *surveillance, but really you should be consulting like the moment someone is outside of normal. That is outside of our scope of practice, but, if she's a woman with a history of something, at this point in this pregnancy, she's still a well woman with a well baby. (W4)*

A delicate balance existed between midwives' scope of practice, their commitment to evidence-based practice and the consideration of client and whānau wellbeing. One midwife explained this interaction between the medical and midwifery models:

> *What all medical staff forgets is that women are all individuals, and it should be woman-focussed and every time we introduce something* [like this new test] *… what impact does it have on the woman's physical and mental wellbeing? And you've got to be very careful that you're not abnormalising the normal and over-medicalising something. (Wi3)*

This balance was exemplified in midwives' descriptions of how they assess clients' risk with regard to PE. Because of the time sensitivity of diagnosing PE, the utility of the sFlt-1/PlGF ratio test could be merely one component of the analysis of an individual's presentation.

> *It's great to have these new tests and they can be really useful but still relying on some of those old-fashioned assessments. And not waiting for a test, when clearly you've got someone with something sitting right in front of you. (Q1)*

Midwives also noted that elevated blood pressure readings would likely require pregnant people to have an obstetric consultation regardless of the test results.

4. The constant concern about the potential for PE and a range of experiences with managing it

Midwives were vigilant for signs of PE, with one stating, "*Pre-eclampsia referrals and management are probably one of the most common issues that we are dealing with*" (B2). Some midwives referred clients at first signs of PE. Others were comfortable managing "borderline" cases and highlighted diagnostic skills, emphasising that "true" PE is often unmistakable, but sometimes requires luck and intuition for timely diagnosis. Midwives of all experience levels were aware of rapidly escalating PE cases and always emphasised caution.

Several midwives talked of clients with fluctuating blood pressure requiring repeated visits to secondary facilities or rapid deterioration, leading to helicopter transfers for delivery. Emotional terms like "sitting on a timebomb," "time sensitive" and situations turning "nasty" or "derailed" captured midwives' reluctance to handle such cases in a rural setting.

> *Being a rural midwife, probably the one thing that you don't want is a*

woman having a pre-eclamptic seizure or that woman's gone on to develop eclampsia and we're here in the rural area administering IV labetalol. (B2)

The assessment burden could be great, especially with midwives practising alone under obstetric guidance. However, tolerance for certain situations varied:

If it was an abnormal PCR I'd ring [the obstetric team]. *Yeah, they are pretty good normally, but sometimes it depends on who it is. Some people have different levels about what they would be worried about. Sometimes I might have been saying, "Hey, this is not normal", and they'll be like, "Oh, no, that's not that bad" or something. (O2)*

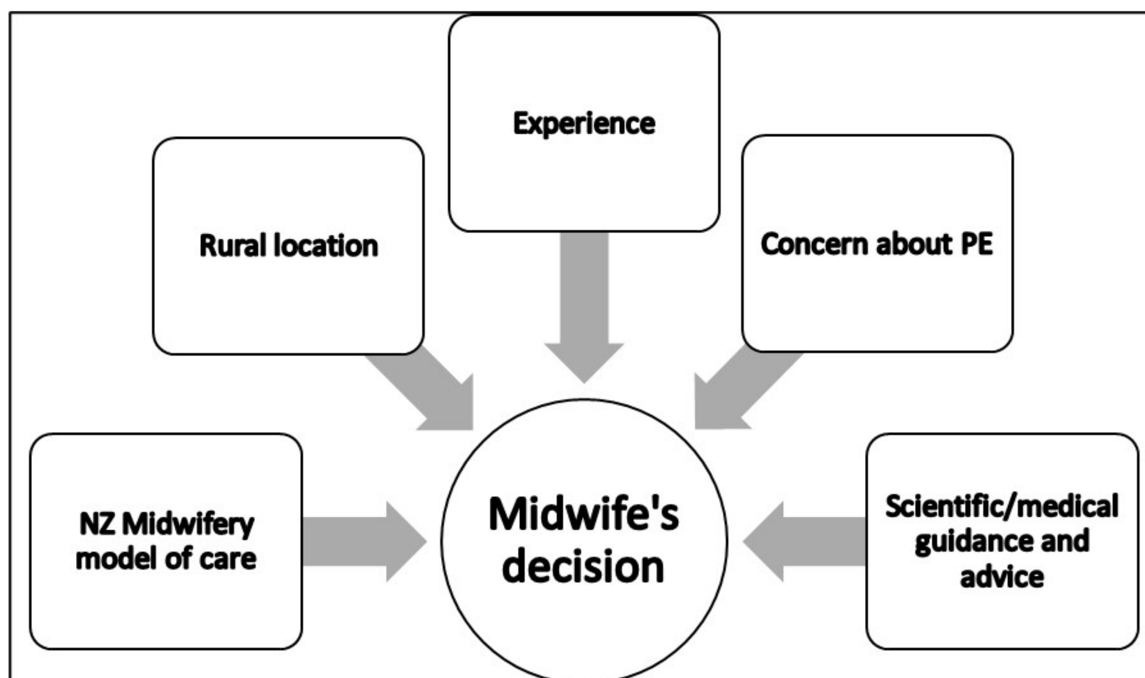
Generally, however, when there were clear signs and symptoms of PE, the recommendation was for the client to go be monitored in a secondary or tertiary facility.

If all the signs and symptoms are showing that it's most likely pre-eclampsia, I'd do a consult with the on-call reg. And then they say, "Get them on the road now." And they will go down in their own car. Usually, they're pretty annoyed that they have to travel all that way, but they do say it's better to be safe than sorry. (A3)

Discussion

Rural midwives in the Southern region of Aotearoa New Zealand bear a significant responsibility in making crucial decisions regarding PE management. Each scenario, with unique pregnant individuals, pregnancies, whānau/families, locations and environments, places the onus on midwives for assessment and decision making. Data analysis from this research provided insights into rural midwifery practice, contributing to the development of a model illustrating how midwives make decisions about PE management in rural Southern Aotearoa New Zealand (see Figure 1). This is conceptualised in the model where rural midwives' PE decision making draws from medical evidence, guidelines and consultation; the rural context (including factors like terrain, weather and whānau/family disruption); a professional partnership philosophy with a foundational understanding of "*women as healthy individuals*

Figure 1: Model of rural midwives' decision making about PE.



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progressing through the life cycle"; and midwives' diverse experience in managing PE, a condition known for its seriousness, unpredictability and variable signs and symptoms.[10,17,23]

Midwives were generally consistent in their approach to PE decision making; however, some variation arose in managing clients with minor or early signs and symptoms of PE. Some expressed confidence to handle such cases in the community because they were assured in their ability to recognise developing PE and were reluctant to disrupt rural clients. This sentiment was notably strong among midwives who had witnessed clients sent to urban hospitals multiple times for monitoring, only to return without a PE diagnosis. Alternatively, others who had experienced eclamptic emergencies had a lower threshold for escalating care to an obstetric team. Local services and intervention distance also influenced the level of caution.

Midwives expressed support for PE diagnostic tests and systems. Their endorsement was confirmed by their use of recommended guidelines and medical test evidence, cognisance of professional boundaries and the importance of obstetric consultation. This nuanced perspective aligns with the dynamic midwifery approach, which is "*based upon an integration of knowledge derived from the arts and sciences; tempered by experience and research; collaborative with other health professionals*."[17] However, in the under-resourced rural context, midwives frequently found themselves balancing their core values against practical considerations. This delicate equilibrium was evident in their perspectives on introducing the sFlt/PlGF ratio test. Midwives supported the test in principle, but they felt that the challenges of implementing it in rural areas outweighed its potential benefits.

This work supports local and international research, which suggests that rural midwives face increased vulnerabilities and challenges compared to their urban colleagues.[22–27] Research shows that they require enhanced practical skills, particularly around emergency management; interpersonal relationships; and resourcefulness, courage and stamina to respond to their challenging, unpredictable and sometimes relentless work.[28,29] Evidence suggests that the risk of adverse pregnancy and birth outcomes increases with extensive travel, and midwifery-led continuity of care is correlated with maternal satisfaction and fewer adverse outcomes than other models of care.[29,30]

This study showed similar pressures for these rural Southern midwives, prompting individual, local and structural responses. Post data collection, Aotearoa New Zealand midwives also received a pay equity settlement. Nevertheless, the adequacy of these interventions to retain and sustain a midwifery workforce relied upon by rural families remains uncertain.

Limitations of this study include the brief time frame of the project, which resulted in a relatively small, potentially non-representative sample. Non-participating midwives (due to busyness or unavailability) may hold diverse views. Interview variations were possible because several TIs conducted interviews using different modes (Zoom, telephone and in-person). Furthermore, the research was supported by the obstetric team at Dunedin Hospital with whom the participants have professional relationships.

In conclusion, this study identified complex challenges faced by rural midwives managing PE cases in Aotearoa New Zealand's Southern region. These midwives expressed enthusiasm for any new innovations or tests that could increase the potential for diagnosing PE and restrict clients' travel for monitoring. However, because of the time taken to get samples to an urban laboratory for the analysis of the sFlt-1/PlGF ratio test, midwives thought it had limited efficacy in these rural settings. Nevertheless, midwives indicated that they thought it could be used for reassurance around safe return to rural homes after women had been admitted for monitoring in urban hospitals. Since the completion of the research, the test has, in fact, been used in this way.

The findings highlighted how midwives use their previous experience and knowledge of PE and maintain a delicate balance between evidence-based practice, rural context and midwifery philosophy in their decision making. It is apparent that each rural area and client has specific requirements and challenges, making it very difficult to generalise about specific practice. This research reinforces the importance of customised strategies for preserving Aotearoa New Zealand's distinctive maternity care model and addressing the unique challenges of rural settings.

COMPETING INTERESTS
The authors declare that there is no conflict of interest.

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