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Supporting Timor-Leste midwives and nurses through an educational program: An evaluative study

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ABSTRACT

Little is currently known about the impacts of participation in a five-week Australian maternal and newborn health training program for Timorese midwives and nurses.

Background: The maternal mortality rate in Timor-Leste is estimated to be around 204 per 100,000 live births, and there is a correlation between safe and quality maternal and newborn health services. Hence, there is a need to develop the nation's maternity workforce. Whilst numerous training programs have been geared towards improving the knowledge and skills of Timorese midwives and nurses, to date, no published study has evaluated their impact on participants.

Aim: To describe satisfaction of an Australian maternal and newborn health training program for Timorese midwives and nurses and its impact based upon the participants survey and qualitative evaluations.

Methods: An evaluative study was conducted using a survey to explore the impacts of a five-week Australian residential training program on 12 Timorese midwives and one nurse.

Findings: The survey data demonstrated an increase in the participants knowledge and skills required to provide enhanced maternal and newborn care; post-training, most participants demonstrated increased knowledge of obstetric emergencies. The participants showed the most pronounced increase in Advanced Clinical Skills in the subjects of fetal assessment, neonatal resuscitation and obstetric emergencies.

The qualitative data identified two main themes and six subthemes related to professionalism, communication, and connections.

Conclusion: An Australian residential training program, provided in collaboration with local Rotary clubs can enhance the development of maternal and newborn healthcare skills for midwives and nurses from Timor-Leste.

Statement of Significance

Problem

Little is known about the quantitative and qualitative evaluations of an Australian maternal and newborn health training program for Timorese midwives and nurses.

What is already known?

Due to the high maternal mortality rate in Timor-Leste, numerous training programs have been geared towards improving the knowledge and skills of Timorese midwives and nurses, mostly conducted in Timor-Leste.

What this paper adds

A collaborative approach with a university and not-for-profit organisation in the provision of professional development for Timorese midwives and nurses can add value to the skills, knowledge and experience of healthcare professionals caring for

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women and newborns.

Introduction

Timor-Leste is a Southeast Asian country of about 1.3 million people, where most of the population lives in rural and remote locations [1]. The maternal mortality rate in Timor-Leste in 2020 was estimated at 204 per 100,000 live births; whilst this has improved from 750 in 2000 [2,3], this remains in excess of the Sustainable Development Goal (SDG) target rate of less than 70 by 2030 [4]. A number of global programs have focused on reducing this rate in Timor-Leste [5]. Whilst reducing maternal mortality rates clearly promotes positive health outcomes and benefits society [6], achieving this requires a midwifery workforce with the skills, knowledge and competence to provide safe and effective midwifery care [7].

High-level evidence has suggested that well educated, regulated, and enabled midwives are key to improving perinatal health outcomes [8,9]. Through the provision of high-quality education that meets global standards [10], there is potential to strengthen midwifery practice and reduce rates of perinatal mortality and morbidity [11–14]. Continuing professional development programs have been suggested as one way of supporting healthcare professionals to maintain competence in the provision of safe and effective maternal and newborn care [15].

Background

Timor-Leste is one of three Southeast Asian countries with few practising midwives and nurses [16]. In Timor-Leste there are just 4.7 nurses/midwives per 100,000 population, while the global average is 22.6 per 100,000 population, and the Organization for Economic Cooperation and Development (OECD) average is 43.6 per 100,000 population as of 2018 [17–20]. Highlighting the critical need to build a skilled healthcare workforce, the World Health Organization (WHO) included Timor-Leste in the 2023 health workforce support and safeguards list [19]. To be a skilled healthcare professional, adequate preparation prior to entering the workforce and ongoing professional development is required [21].

Providing professional development programs to develop the knowledge and skills of the healthcare workforce in Timor-Leste requires strong leadership, and access to experienced clinicians and academics. Considering the existing global health workforce shortage and the WHO estimating that there will be a global deficit of 15 million healthcare workers by 2030 [14]. Timor-Leste, like many other low- and middle-income countries, does not have the skilled human resources required to facilitate this development [22]. This in turn limits the ability to develop capacity and thus establishing a skilled health workforce becomes problematic when supply increasingly fails to meet demand [20]. The lack of healthcare personnel creates increased workload pressures, further limiting professional development opportunities [23,24].

The funding arrangements for the project this paper reports upon necessitated the delivery of the training in Australia. This decision was not arbitrary, but a strategic one. It was made to provide participants with the opportunity to undertake professional development in a developed health system and learning environment, which could significantly enhance their skills and knowledge. The choice of Australia, a country with remarkably low maternal and perinatal morbidity and mortality rates, was strategic to ensure the best learning outcomes for the participants. Thus, conducting the program in Australia rather than in Timor-Leste was a crucial and well-considered decision. This training program was developed and delivered by Australian academics within an Australian context, with only one member possessing extensive experience with Timor-Leste maternity services. While acknowledging our limitations in delivering a fully decolonised curriculum, every effort was made to create an authentic and targeted teaching and learning design relevant to the learning needs of the participants. The program was led by a senior academic with experience in Timor-Leste, ensuring informed and culturally sensitive guidance throughout the development process.

Several global programs have been delivered in Timor-Leste to address this gap in professional development programs and provide midwives and nurses with opportunities to develop their knowledge and skills further; these programs have focused on reducing perinatal morbidity and mortality rates [5]. This paper reports on a novel approach to delivering education and training in the Australian context rather than in Timor-Leste. Thus, this study aims to describe an Australian maternal and newborn health training program for 12 Timorese midwives and one nurse and report their survey and qualitative evaluations.

Participants, ethics and methods

Maternal and newborn health outcomes is one of Rotary's six priority pillars globally [35]. To improve health outcomes and reduce mortality in Timor-Leste, a consortium of Rotary Clubs in Mackay Queensland, Australia collaborated with CQUniversity's School of Nursing, Midwifery, and Social Sciences to provide education to Timor-Leste maternal and newborn health clinicians. The participants received full sponsorship including passports, visas, flights, accommodation, meals and weekly stipends enabling them to travel to Australia to take part in the program.

In January and February 2023, 12 midwives and one nurse from Timor-Leste spent five weeks at the Mackay campus of CQUniversity, Australia. They participated in an immersive program designed to strengthen maternal and newborn health knowledge and skills underpinned by situated learning theory [25]. Behaviours and skills that support delivery of high-quality health services for mothers and newborns were the focus of the education sessions. Senior midwifery and nursing academics at the university, and midwifery clinicians external to the university facilitated a five-week training program. Other non-academic staff members and volunteering Rotarians also supported the program participants. The sessions included varied clinical skills development, case scenarios, obstetric and newborn emergencies, quality and safety, leadership and management, evidence-informed practice, and other non-clinical training sessions.

Situated learning theory

Situated learning theory is a social and dynamic process where learners engage in cultural and historical activities in communities of practice – agent, activity and the world are mutually interdependent [25]. The nature of knowledge creation rests on the notion that social, historical and cultural constituents of knowledge must be achieved through participation as community members rather than as individualistic learners. The midwives and nurse from Timor-Leste recognised the need to enhance their practice, knowledge, and skills to improve health outcomes for mothers and babies in Timor-Leste. They embraced working collectively to acquire evidence-based practices, knowledge, and skills. Similarly, the Australian academics were taught the contextual knowledge and the advanced skills required of a midwife in the Timor-Leste context by the participants. This promoted a two-way transfer of knowledge.

The learning was developed and structured in such a way that it would be relatable to their own communities of practice in Timor-Leste. This was further enhanced by the real-time integration of participants' feedback and contributions, particularly during clinical simulated learning, where they shared their skills and knowledge. Hence, we delivered the classroom activities without other Australian nursing and midwifery students. The program conveners intended the Timor-Leste midwives and the nurse to interact with one another and the

academics so that they could situate their learning to time, space, society and culture allowing for flexibility in the program delivery to enhance relevance. The program participants viewed the participating academics as co-creators rather than producers of knowledge and skills. Additionally, the program was built on the International Confederation of Midwives (ICM) Essential Competencies for Midwifery Practice (2019), covering four domains: General Competencies, which address the midwife's autonomy, accountability, and relationships; and specific competencies for pre-pregnancy and antenatal care, intrapartum/birth care, and postnatal care of women and infants [40]. During their time in Australia, in all classroom sessions and activities, the academics facilitated discussions on what the participants knew and practised whilst remaining cognisant of the practice environments in Timor-Leste. The classroom discussions recognised the need to focus on the contents, contexts (Timor-Leste and Australia), expert-participant interactions and reasonably practicable skills that are effective in Timor-Leste without compromising quality and safe maternity care.

The teaching team wanted the midwives and nurses to translate their learning to real-time social impact in improving health outcomes for mothers and babies in Timor-Leste, and there was an emphasis on the requirement for each participant to develop and implement a quality improvement project to be planned and executed at their respective practice environments. Each participant engaged in some activities to facilitate this need during the planning and implementation of their quality improvement projects. This engagement allowed them to view learning as an integral part of generative social practice [25] in their practice environments. The participants chose their respective quality improvement projects based on the identified practice deficiencies, their areas of interest, and their clinical practice needs.

The project was operationalised in three stages which included: 1) provision of the training, 2) in-country follow-up, and 3) refresher sessions.

Stage 1: Provision of Training to Timorese Midwives and Nurses in Australia

Training and resources, including access to the university's online resources, were provided to assist participants with their learning. This approach promotes utilisation of research findings for implementing evidence-based practice [26]. Each participant was also required to develop a quality improvement project for their in-country healthcare service.

Stage 2: Data Collection in Timor-Leste.

Two Australian academics – one senior midwifery and one nursing academic travelled to Timor-Leste to undertake in-country follow up on the implementation of each participant's quality improvement project.

Stage 3: Training Team in Timor-Leste for Facilitator Refresher Training

The Facilitator Refresher training provided education on aspects of training, assessment, and project management.

Participants, setting and research team

Participants for the program were chosen from a large pool of applicants. Rotary members travelled to Timor-Leste to interview potential candidates. An essential selection criterion was the ability to speak and write in English. Fifteen participants were accepted to attend a five-week program in Australia, however only 13 participants attended, 12 midwives and one nurse. One participant withdrew just before departure from Timor-Leste.

The researchers and authorship team comprise of seven senior midwife academics – Professor of Nursing and Midwifery (PhD); Associate Professor of Nursing and Midwifery (PhD); Associate Professor of Midwifery (PhD); and others with postgraduate qualifications in midwifery and completing PhD studies, one nurse academic (completing a PhD) and one senior librarian. One of the senior midwife academics had practical experience working as a midwife in Timor-Leste and became a Rotarian upon completion of the project.

All authors participated in the development and delivery of the program, either face-to-face or virtually over a five-week period in Australia. A team of academics provided leadership and oversight of the program development, implementation, and evaluation, and the guidance required to deliver the program successfully. The desire to contribute to improving the quality and safety of maternal and newborn care in Timor-Leste motivated the researchers to participate in this study. The project's origin from Rotary was altruistic, and it was deemed important to evaluate and disseminate the outcomes of this project.

Sampling strategy

The Rotary team distributed the expression of interest (EOI) via social media through professional contacts. One hundred expressions were received, 60 longlisted and 30 shortlisted for face-to-face interviews with the international panel in Timor-Leste (Timorese and Australians). Fifteen successful applicants accepted the offer, but 13 attended the program in Australia. Two applicants withdrew—one had a scholarship elsewhere, and the other provided no reason. As part of the ethical approval, all participants had the option to opt out of the research without any repercussions.

Data collection and confidentiality

Research team member BJ designed the survey tool used for the data collection based on the literature and professional experiences working as a midwife in Timor-Leste. Data collection had three-time points:

1) Baseline pre-workshop knowledge;
2) Immediate post-workshop knowledge; and
3) Knowledge transfer after the participants had returned to Timor-Leste.

The first and the second collection points occurred at the CQUniversity, Australia, where the training occurred. The participants undertook pre- and post-training assessment and program evaluation in Australia, whilst 11 engaged in the 6-week post-training data collection in Timor-Leste. One of the midwife academics (BJ) who speaks Tetun, clarified the questions with the participants.

As per the National Statement on Ethical Conduct in Human Research, CQUniversity requirements and ethical approval, all evaluation responses were de-identified and no participants are identifiable.

Data Analysis

Three surveys were used to collect qualitative and survey data at each data collection point. The pre-training survey occurred just before the commencement of the program in Australia, the post-training survey occurred immediately after the training program in Australia, and in-country training happened two months after the participants returned to Timor-Leste. Research team member (BJ) manually entered and analysed survey data using descriptive analysis, and BF, LW and TC analysed qualitative data using thematic analysis. Due to the small number of participants, there were no discrepancies in data analyses. Two authors (BF & LW) undertook the qualitative analysis, peer-reviewed by the authorship team, who agreed with the analysis: member checking.

Ethical considerations

Ethical approval was obtained from the CQUniversity Human Research Ethics Committee (0000024059) before the training program commenced. Participants received a written consent form and could opt out if they did not wish the data to be used for research purposes. Identifying information was not collected from the participants.

Findings and results

All of the participants completed the evaluative components of the program. All participants worked in maternity settings, with the majority being clinically based. Several identified as non-clinical which included working in safe motherhood programs, as a university educator, and positioned in quality control. One was a freelance midwife during the program, and one was waiting confirmation of ongoing employment during stage 3.

Braun & Clarke's thematic analysis [27] was used to analyse the qualitative data from the pre- and post-training collection points. This method was chosen because it provides a systematic way to identify patterns and develop insights within the data. The analysis began with the researchers (BF & LW) becoming familiar with the data, generating initial codes, and developing themes. The researchers refined, defined, and organised the themes using Microsoft Excel spreadsheets as the analysis continued. The findings are presented by data collection timepoints below. The survey data were analysed and presented demographic data, changes in knowledge and skills using descriptive statistics of tables and charts.

Years of postgraduate continuous practice ranged from two years to 30 years, with most participants having worked greater than 11 years, with all working fulltime.

All clinicians were able to report various clinical activities, although at small numbers. This is reflective of the small populations of clinicians in Timor-Leste and the reality that over 50 per cent of births are not attended by skilled attendants [39]. All participants reported that Timor-Leste had a maternal mortality rate of an estimate of 218 per 100, 000 births, whilst the perinatal mortality rate reported by participants ranged from 22/1000 births to 100/1000 births.

Participants' demographics

See Fig. 1

Qualitative findings

Pre-training. The pre-training questionnaire aimed to elicit learning goals and plans for implementing new knowledge upon their return. The three main emergent themes and subthemes are presented below.

Professionalism. During analysis, a central theme emerged: professionalism. Professionalism was further broken down into two subthemes, the first being clinical confidence and enhancing safety and the second being non-clinical leadership. Professionalism is characterised by a commitment to self-awareness, with midwives actively seeking continuous improvement in clinical and leadership capacities. This was evident in the data and characterised by the participant's candid acknowledgement of their skill and knowledge gaps.

> Participant: "I want to learn more and gain new knowledge and skills. I recognise my skills in maternal child health, but I can improve and want to implement what I learn in Timor-Leste for all."

Furthermore, professionalism manifests in midwives taking pride in their work and believing in their capacity for ongoing learning and skill development, which was also strongly evident in the data collected. A key aspect of the participants' professional ethos was the desire to receive a high-quality education, reflecting a dedication to self-improvement and staying abreast of advancements in maternal and newborn healthcare practices.

> Participant: "I want to receive education from the latest in midwifery skills according to the standards to be safe and effective, to provide quality midwifery care to every mother and baby who needs it."

Importantly, professionalism in the data was underscored by a strong motivation to enhance women's health and sexual and reproductive health rights throughout Timor-Leste women's lifespans. This comprehensive commitment, evidenced in the data, embodies the core tenets of professionalism in midwifery.

> Participant: "My goal is to support pregnant women to have a healthy pregnancy and support parents of infants and children and all of the family to help the mother and child get good health and well-being."

Subtheme: Clinical confidence and enhancing safety. Clinical confidence in midwifery is a midwife's self-assurance in their ability to perform clinical tasks competently [28]. This confidence is vital for the safety of mothers and babies, correlating with competent decision-making, effective communication, skill proficiency, and recognising and mitigating risks. The relationship between clinical confidence and clinical safety underscores the importance of ongoing education and training that fosters evidence-based practice. The data revealed a strong participant desire to develop clinical confidence and provide safe maternal and newborn care.

> Participant: "My goal is to develop my leadership and communication skills, especially for obstetric emergencies, develop my professional attitude and behaviour and make evidence-based decisions in an emergency."

Participants expressed a genuine desire for comprehensive learning and proficiency in practical, hands-on skills and the cognitive tasks essential for assessing, analysing, and evaluating maternal and fetal biological information. The data emphasised the desire to cultivate competencies for adept clinical decision-making and effective risk mitigation across the childbearing continuum. The overarching theme of enhancing safety during labour and birth was central to their aspirations.

> Participant: "My goals are good communication to women, families and my colleagues, especially during emergencies, but also for clinical handover and ISOBAR, and antenatal care and research."

A specific focus emerged on elevating clinical competence and safety, entailing the early identification of potential risks and prompt recognition of maternal health deterioration during pregnancy.

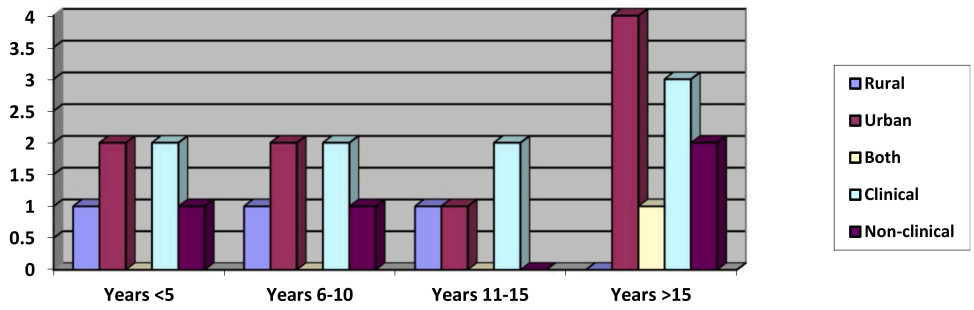

Fig. 1. Roles of Participants.

> Participant: "My goals are to improve my knowledge and the ability to provide care for women and children. My priority subjects are to learn how to undertake a good examination of a pregnant mother during antenatal care from the first to the fourth visit."

Participants expressed a desire to mitigate complications proactively, wishing to foster confidence in navigating obstetric emergencies collaboratively as team members and as clinical leaders during emergencies.

> Participant: "My priority is to learn more about obstetric emergencies, newborn resuscitation, early signs of danger in antenatal and postnatal care. I want to implement this with my colleagues and students and apply it in my country."

The participants' apprehension regarding perceived deficiencies in their fetal surveillance skills and understanding fetal heart rate characteristics were noteworthy within the data. This concern extended to the desire for enhanced proficiency in midwifery skills to identify fetal distress or facilitate timely referrals to obstetric care, thereby addressing a critical aspect of maternal and fetal well-being.

> Participant: "I want to know how to make a good examination of a mother and fetal assessment by using CTG or a Doppler/US and learning competency about newborn assessment, resuscitation and a healthy infant."

Participants expressed motivation to augment their knowledge and skills in newborn care and neonatal assessment. The desire for training in neonatal resuscitation emerged prominently, indicating a recognised need for comprehensive competencies in addressing potential challenges related to neonatal health.

Subtheme: Non-clinical Leadership. Leadership outside of hands-on clinical competency and seniority emerged as a subtheme of professionalism. The data exhibited participants' comprehension of nuanced leadership qualities, emphasising the intrinsic human attributes essential to effective leadership. Key attributes identified within the data were a solid commitment to being a role model, adept interpersonal communication, and a respectful demeanour towards patients and colleagues. Many of the participants' motivation was to acquire a comprehensive skill set in management and business, wanting to optimise the administration of health clinics while judiciously managing finite resources.

> Participant: "I want to learn health system management of maternal and child health and reporting of mortality and perinatal death review."

The data revealed an explicit interest in research endeavours, focusing on establishing a symbiotic relationship between research outcomes, guideline development, and the enhancement of quality measures. This interest extended to a desire to learn the implementation of rigorous monitoring and evaluation protocols to ascertain causation, effectiveness, and impact to augment patient and community engagement within the healthcare service. Participants articulated a keen aspiration to serve as exemplars and academics within their healthcare setting.

> Participant: "My quality improvement plan includes improving training to reduce maternal and neonatal death. I will teach new knowledge to my friends and colleagues and provide training for nurses and midwives."

Data demonstrated that participants emphasised the pivotal role of robust documentation and acknowledged the current deficit in documentation. Furthermore, participants articulated a discernible interest in developing maternal and neonatal death reporting proficiency. This interest underscored an acute awareness of the pivotal role of systematic data collection in comprehending perinatal risk factors and adverse outcomes. *Participant: "I want to develop the ability to undertake quality activities and good maternal and neonatal audits to strengthen reporting systems and indicators from different levels of clinical care."*

This collective perspective encapsulated a broader acknowledgement of the indispensability of non-clinical determinants in shaping health services management, fortifying patient safety protocols, and addressing mortality and morbidity considerations.(Fig. 2)

Post-training. Post-training data were collected on the last day of a five-week program in Australia and in-country using questionnaires.

Professionalism, leadership and connection. The tenacity of professionalism and leadership persevered as a central theme throughout the project. Salient facets of professionalism and leadership that garnered heightened attention in the data included the provision of respectful care toward both women and peers, acts of kindness, and the judicious application of knowledge to elevate colleagues. *Participant: "This program gave me more courage to learn, act and do simple things for good leadership and management. The lecturers have a kind way of explaining everything."*

A notable emphasis was placed on fostering a psychologically safe milieu and the altruistic sharing of knowledge filled with the intention to promote learning, hence fostering connections. Participants expressed that the trainers in the project had exemplified these qualities, with one participant saying the seamlessness of her relationship with the trainers, who made her feel limitless in her capacity to learn and grow.

> Participant: "The lecturers are so nice and always imparting their knowledge. This increased my opportunity to learn. The relationship between the lecturers and us is limitless as the explanation did not make me feel small, and it built my confidence."

Subtheme: Respectful care and practice. The participants underscored the significance of providing respectful care to women and fostering collegial relationships with colleagues through considerate interactions with staff.

> Participant: "I learnt about respectful midwifery care and how to give information to a mother with respect. I will use good communication for quality and service improvement to build good relationships and trust as my plan is to increase births at the community health centre."

There was a strong emphasis on the participants' desire to contribute to their colleagues' professional growth by sharing acquired knowledge and initiating quality improvement projects in their workplaces. The data analysis revealed a collective realisation among participants that implementing evidence-based care is integral to fostering respectful practice. Moreover, participants significantly enhanced clinical confidence across the entire child- bearing continuum. Confidence improved in general, midwifery skills and tasks coupled with a heightened proficiency in recognising warning signs and managing obstetric emergencies. *Participant: "I have implemented a quality improvement project and collaborated with stakeholders and the health post staff. Sometimes things don't run smoothly, but mostly, we have fun, and the information and health promotion activity are very much needed in the health post."*

Subtheme: Communication and professional relationships. The subtheme of communication aligns with the provision of respectful care, constituting an indispensable leadership component within professionalism. The data elucidated a notable uptick in participants' confidence levels pertaining to the execution of ISOBAR and clinical handovers, consequently enhancing their interprofessional communication skills.

> Several Participants stated that "Communication skills including ISOBAR" were in the top three skills learned or improved because of the training program."

Participants reported that enhanced communication proficiency extended beyond standard clinical midwifery practice to encompass wider yet highly relevant domains such as obstetric emergencies and gender-based violence case management. Additionally, participants expressed a desire to seek patient feedback through complaints and

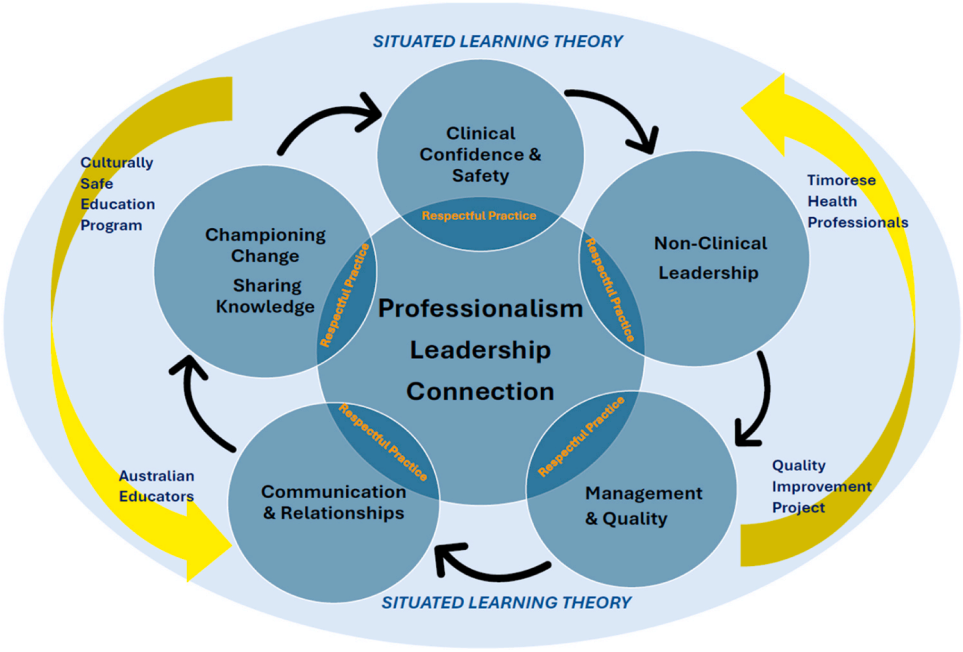

Fig. 2. Diagrammatic representation of interconnectedness of themes and subthemes.

compliments, indicating an openness to receiving communication for growth.

> Participant: I developed a feedback form and provided a complaint box in our health centre, and now we use the suggestions to prepare the health centre better."

Subtheme: Management and Quality. The training program catalysed the inception, development, and implementation of quality improvement projects in the participants' home country. Whilst the various projects remain at varying degrees of implementation, a notable surge in participants' confidence levels was realised by undertaking such an endeavour. Thus, reflecting an enhanced understanding of evidence-based practices and techniques that could be seamlessly integrated into their respective workplace contexts. The scope of these quality improvement endeavours ranged across the childbearing continuum, including various target areas such as maternal neonatal death reporting, monitoring and evaluation of services standards, kangaroo mother care, post-operative birth practices emphasising skin-to-skin contact, and the strategic utilisation of information technology resources to augment health services. *Participant: "I'm using my quality improvement project to update and improve the Liga Inan mobile app program."*

Particularly noteworthy was the participants' commitment to perinatal audits as a core component of their quality improvement initiatives. This involved applying research skills learned during the training program, contributing to the systematic accumulation of perinatal evidence. *Participant: "We monitor daily and monthly and then evaluate our services. I coordinate with my manager, director, and district director to improve services."*

The intention to undertake data collection of this nature extended beyond the local context, with participants actively aspiring to share their findings both locally and nationally. The findings revealed that participants' engagement in quality improvement projects transcended the mere application of learned concepts; it demonstrated a proactive approach towards leveraging evidence-based practices to enhance the quality of care provided.

Subtheme: Championing change and sharing knowledge. Participants disclosed their ambition to act as change agents, emphasising their commitment to disseminating their new knowledge. This included initiatives such as facility visits beyond their primary place of work, holding in- service training, and educational sessions. Furthermore, participants expressed their intent to contribute to developing new guidelines and policies within their healthcare settings to influence change and bring about improved outcomes.

> Participant: "I would like to collaborate with the head of the health centre, the Ministry of Health, and the Department of Maternal Child Health to enhance the reporting of Maternal Perinatal Deaths. In addition, I would like to provide training to healthcare workers to reduce mortality rates and improve the clinic's reputation, thereby encouraging more mothers to seek medical care."

Participants' forward-looking approach encompassed the conception of contemporary and technological quality improvement projects, leveraging mobile applications like Liga Inan to promote women's active participation in maternity healthcare. Additionally, participants articulated a solid aspiration to broaden their professional network and influence by visiting health centres and posts in diverse locales. This envisioned expansion aims to share knowledge, provide training, fortify referral pathways, and foster collaborative relationships throughout the participants' broader health network, solidifying their role as change agents within the healthcare system.(Table 1)

Survey results

Pre-, post- and follow-up. Self-assessment of level of knowledge and skill related to clinical and non-clinical components of care were conducted pre-program, post-program, and at follow-up 6 weeks after the program.

Non-clinical activity. The non-clinical activity reported varied with student training featuring highly, and maternal death review and performance review (self and staff) having less activity.(Fig. 3)

Knowledge self-assessment level of advanced. This dataset measured knowledge and self-assessment of skill and the data revealed that self-assessment were rated from advanced to basic, and for the purpose of this study, advanced and intermediate knowledge were aggregated and reported here as 'advanced knowledge level'. Selected core components of knowledge related to non-clinical skills for maternal and newborn care are reported here including quality activities, performance review, maternal death surveillance (MDSR), perinatal mortality review (PNMR), student training and graduate training.

Table 1
An overview of selected participants' quality improvement projects.

QIP Title	Activities	Outcome
Increase Antenatal Care uptake	Staff education. Roster scheduling for care visits. Schedule antenatal care appointments. Community awareness.	Increase in antenatal care episodes by 40 per cent in first 2 months.
Increase in Birth in Facility	Staff education. Roster midwives to provide 24/7 care. Community awareness. Facility readiness.	Increase in facility birth from 1.6 per cent in previous year to predicted 82 per cent in current year (from 1 birth in facility in 1 month to 17 births in facility in first month).
Improve fetal heart rate monitoring during labour	Staff education. Staff practice. Equipment with instructions. Referral system for suspected fetal heart rate abnormalities. Audit.	Increase in knowledge and skills. Increase in equipment and maintenance plan. Increased knowledge of fetal distress. Recognition of abnormal fetal heart with referral to higher level service facility. First month, 2 women transferred following recognition of abnormal fetal heart rate.
Stillbirth prevention	Implementation of specific modules of Safer Baby Bundle. Fetal movement monitoring. Side sleeping. Growth monitoring. Staff education. System for counting and recording number of movements. Womens awareness. Audit including documentation audit.	Increase in knowledge and skills. Increase in equipment. Auditing aspects maintained as business as usual. Recognition of high-risk babies in utero (fetal movement, growth) with 4 babies identified, surviving birth by emergency means (4 stillbirths averted).
Feedback boxes	Staff education. Patient education. Policy development (safety and quality). Supportive tools support (boxes provided). Feedback review and audit.	Increase in knowledge about feedback. 20 feedback reports reviewed in first month. Additional boxes provided to clinical facilities.
Skin-to-skin newborn care in operating theatre post caesarean section	Staff education. Policy development: consent required by medical staff. Policy implementation: woman's consent. Community engagement. Audit rates.	Increase in knowledge and skills. Medical engagement related to consent by surgeon. Review documentation forms and streamline. Information pamphlet for women. Skin-to-skin provided 5 times in first month (never provided before).
Kangaroo Mother Care (KMC) in the Neonatal intensive care unit	Staff education. Mother and father education. Documentation. Policy and process. Audit.	Increase in prevalence and length of time of kangaroo mother care without any compromise. Temperatures stable, increased from minutes to hours of consolidated KMC.
Liga Inan e-record messaging	Staff education. Redirection of finances. Policy review. Audit.	Increase in midwifery data input into Liga Inan e-record. Review of messaging content Increased uptake by women.
Maternal and newborn community assistants	Staff Education. Community training program. Community awareness.	Increase in number of community assistants. Increase in uptake of antenatal episodes in the community. Increase in facility births.

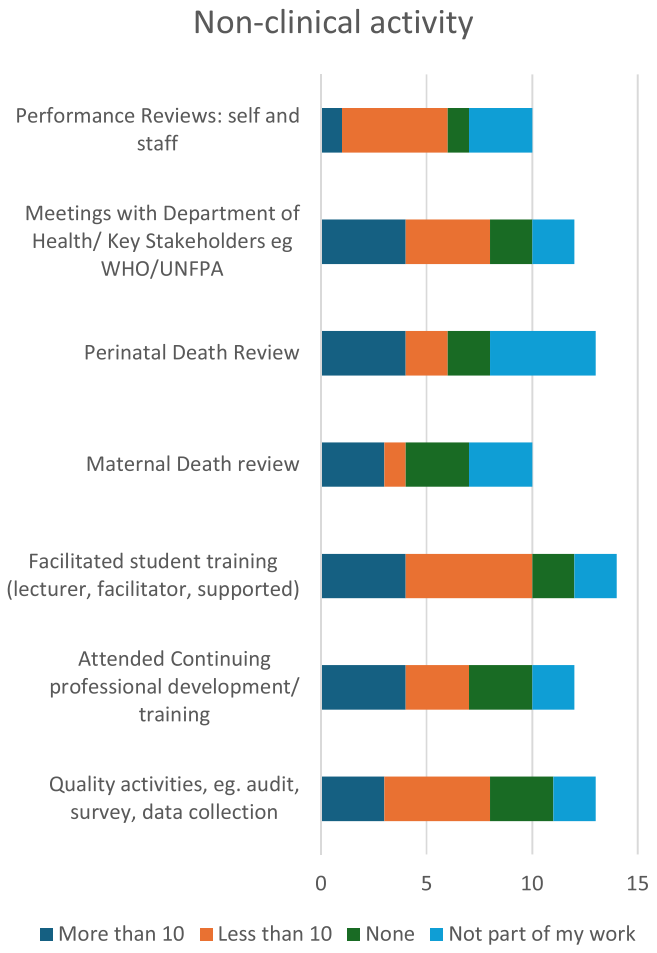

Fig. 3. Non-clinical activities included in the survey.

Participants reported a relatively low level of knowledge pre-training related to maternal death surveillance and perinatal mortality review. There was an increase in self-assessment of advanced level in all items, the most marked being performance review whereby knowledge increased from 38 per cent of participants reporting advanced level of knowledge pre-training to 85 per cent reporting advanced level of knowledge post-training. Participants reported a doubling (approximate) in advanced level of knowledge of quality activities (from 54 to 85 per cent), maternal death surveillance (from 38 to 69 per cent), perinatal mortality review (from 38 to 69 per cent) and graduate training (38–85 per cent).

The self-assessment level of advanced knowledge continued to increase at follow-up for key performance indicators, quality activities, continuing professional development and performance review. (Fig. 4)

Knowledge specific to maternal and newborn emergencies was conducted pre-training and post-training. These included: danger signs in pregnancy, obstetric emergencies, postpartum haemorrhage, neonatal resuscitation, danger signs in the newborn and knowledge of three-day delay model. (Table 2)

There was an increase in knowledge for all emergency scenarios with the greatest increase being in knowledge related to obstetric emergencies and neonatal resuscitation. For maternal danger signs, of which there are eight agreed signs, on average each participant was able to report they knew 3.4 (42 per cent) pre-training increasing to 4.5 (56 per cent) post-training, an increase of 33 per cent from baseline. This was similarly reported for postpartum haemorrhage where participants were able to report 3 of 8 features pre and 3.4 features post-training. Neonatal resuscitation showed a 43 per cent increase in knowledge post-training (from naming 2.1 of 6 resuscitation efforts and 3, pre and post-training

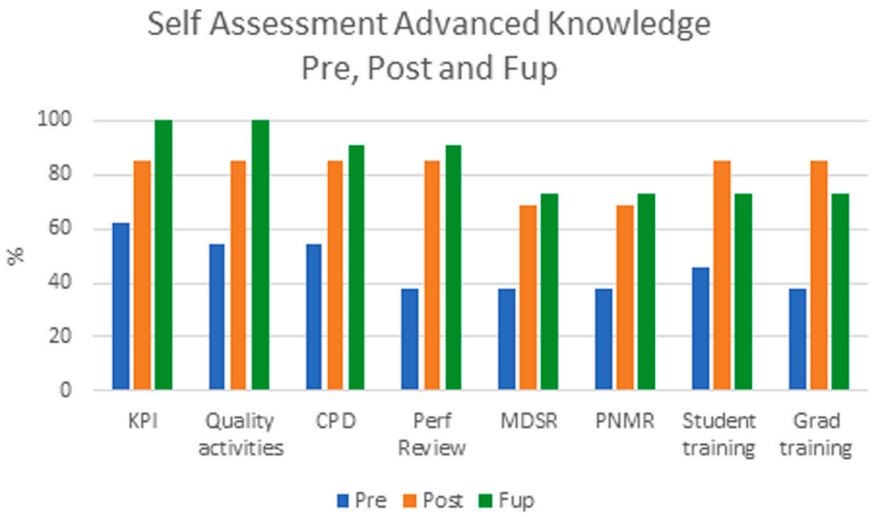

Fig. 4. Self-assessment of Advanced Knowledge.

Table 2
Knowledge of emergencies.

Emergency = number of correct answers	Pre (%)	Post (%)	% increase
Maternal danger signs n=8	3.4 (42)	4.5 (56)	33
Obstetric emergencies n=7	1.8 (26)	2.9 (41)	57
Postpartum haemorrhage n=8	3 (36)	3.4 (43)	19
Neonatal resuscitation n=6	2.1 (35)	3 (50)	43
Newborn danger signs n=11	3 (27)	3.8 (35)	30
Three-delay model n=3	2.1 (70)	2.5 (83)	19

respectively). Despite there being only three features in the three-delay model (access to care), no participant was able to describe all the features.

Clinical Skill self-assessment advanced level. Data for advanced and intermediate skill level were aggregated and reported here as 'advanced skill level'. Selected core clinical skills expected in maternal and newborn care are reported here including antenatal care, intrapartum care, fetal assessment (growth, movements, and fetal heart rate monitoring), obstetric emergencies and neonatal resuscitation.

There was an increase in self-assessment of all measures at the end of training, which was maintained for antenatal care and intrapartum care at follow-up. The most pronounced increase in self-assessment of advanced skill level occurred for fetal assessment, neonatal resuscitation and obstetric emergencies. There was lesser maintenance of the skill at follow-up, especially obstetric emergencies and neonatal resuscitation. (Fig. 5)

Training Program Experience. All participants (n=13) reported their goals had been met (well and very well met), which was consistent as all participants also reported that their priorities, previously identified, had been addressed. All participants were satisfied with the training program, and all respondents would recommend the program to a colleague. The positive recommendation outcome persisted whereby the follow-up in country assessments by participants concurred.

During the in-country follow-up assessment participants were asked to describe what changes to practice they have achieved in their workplace. Responses commonly included: increased facility birth, altered rostering schedules, communication training and consolidation (with women and colleagues), fetal heart rate monitoring according to best practice, antenatal care practices, and documentation.

Discussion

The current project aimed to deliver a professional development program underpinned by situated learning theory [25] to enhance midwifery and nursing knowledge for a group of Timorese maternity

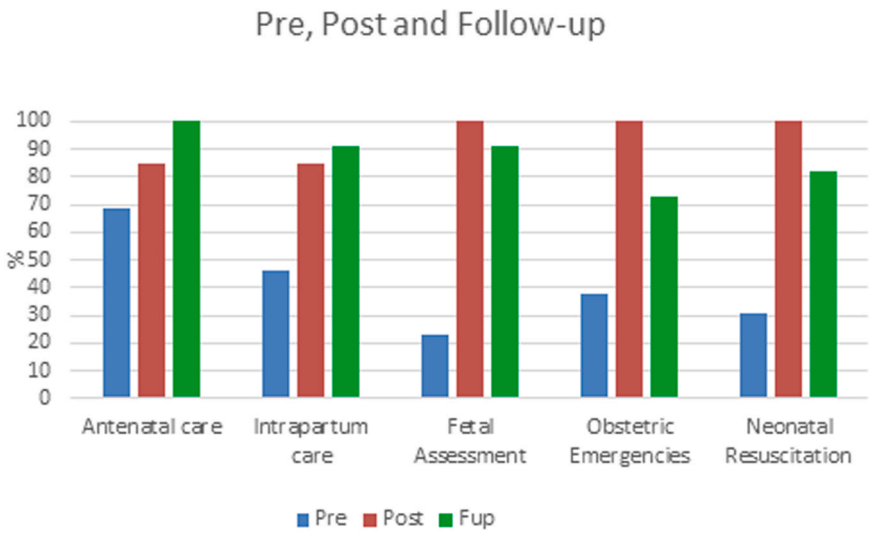

Fig. 5. Self-assessment of Advanced Clinical Skill.

care providers. Prior to undertaking the education, the participants wished to enhance their capacity to provide safe care to women and babies during the childbearing continuum in Timor-Leste. In particular, fetal surveillance, obstetric and neonatal emergency management, perinatal data reporting, and increasing capacity to train others were highlighted as priority areas for professional development by the participants. Unsurprisingly, these priorities reflected the characteristics of the WHO's five elements of the Regional Strategic Directions for Strengthening Midwifery in South East Asia Region 2020–2024 [14], namely *governance and regulation*, *midwifery education* system, *education and training*, *practice and service delivery*, and *research and evidence*. The various elements of the education program were similarly reflective of these elements.

In relation to fetal surveillance and obstetric emergencies, an increase in self-assessed knowledge occurred between the pre- and post-training surveys. However, the follow-up surveys identified that the participants had not maintained this knowledge at the same level they had upon completion of the workshop. A potential reason for this may be due to the discrepancy between the availability of sophisticated equipment that was utilised during training in Australia, but not widely available in Timor-Leste, resulting in limited opportunities to consolidate learning. Another confounding factor may be the rarity of emergencies resulting is lack of consolidation of training in practice. Existing literature has indicated that the scarcity of both basic equipment [29] and medical technologies [30] is a common inhibitor of midwives' capacity to provide adequate care in resource-limited settings. Furthermore, knowledge retention may have been affected by differences in "actional contexts" described in situated learning theory [25] between the learning environment in Australia and the reality of the workplace environment in Timor-Leste.

The post-education qualitative data evaluation identified that the participants had developed their knowledge in relation to midwifery management and felt confident to lead and share their knowledge with others at local and national levels. The survey findings were congruent with the qualitative data, showing an increase in self-assessment of advanced level knowledge of midwifery management immediately post-education which continued to increase at a five-week follow-up survey. Similar to what the current findings revealed, [36,37] found that professional development program and its follow-up supervision have positive impact on maternity services. The implementation of ongoing education and supervision following formal education programs has demonstrated improved skill retention amongst maternity caregivers in resource-limited countries [32]. The study participants received in-country follow up and refresher education from Australian midwifery and nursing academics on management, leadership and project work several weeks after completion of the program. They also remained engaged with their learning upon return to the workplace, as they continued to work on the quality projects they identified whilst in Australia. In addition, the University provided one year access to the University's online library to support participants' access to online databases used for evidence-based practice.

The participants' desire to grow their professionalism emerged as an overarching theme from the pre-education survey data. Post-education findings revealed that these desires had been fulfilled across a range of professional qualities pertaining to the principle of respectful midwifery care. However, a particularly interesting finding was that the participants had a new perspective on the importance of communication with women and colleagues for the provision of respectful maternity care. This is an important step forward, because it aligns with goals of the ICM Guide for Midwifery Leadership [31]. The ICM Guide for Midwifery Leadership posits that all maternity services must establish midwifery leadership under the auspices of political strategic leadership, operation, regulation, education, research, and clinical leadership so that midwifery students, newly qualified midwives, and junior midwives can develop the skills and knowledge necessary to deliver compassionate midwifery care.

Prior research has elucidated women's experiences of maternity care in Timor-Leste as sullied by disrespectful practices including unkind communication, discrimination, and verbal and physical abuse [16,33]. This finding is consistent with those of a study by Afulani et al. [34] which reported the results of participation in a program by maternity caregivers in a resource-limited country, delivering education on clinical topics and respectful maternity care. Like the participants in the present study, following completion, the participants communicated their newfound understanding of how communication, and respectful maternity care can enhance provision of quality care. Participants received an educational program that empowered them to deliver influential women's services that meet the needs of individuals, families, and communities within the gambit of effective midwifery leadership. The findings presented are a direct result of this program. The participants' senior, experienced, and influential status in hospital clinical care, senior management, university departments, and ministry levels ensures capacity building. Mentoring leaders continues within the teaching team.

Study limitations and recommendations

This was a qualitative study that involved small number of participants, yet the researchers remained conscious to the fact that there was power imbalance between Western academics and participants – socio-economic imbalance [38]. Future recommendations include delivery of the program in the country of origin and that local midwifery association and institutions are engaged at every stage of the program development, implementation and evaluation. Conducting the program in-country would be beneficial for cultural and financial reasons. Programs delivered in-country can be tailored to specific healthcare practices within the local cultural context and would be more cost-effective with consideration to the participants' travel, accommodation, and living expenses. When considering future iterations, participants' proficiency in English language should be considered at the stage of designing, planning and implementation. Also, train-the-trainer component to be built into the program – first cohort could be invited back to Australia to work with Australian senior midwives as team teachers to build educator capacity building and empowerment. Lastly, the descriptive survey data should be considered with caution due to small number of participants.

Conclusion

Delivering an Australian onshore culturally-safe-framework professional development program for Timorese maternity care providers over a 5-week period has shown to have a positive impact on the knowledge and skills required to provide evidence-based maternal and neonatal care in Timor-Leste. As identified in the data, the participants have the knowledge and skills to continue in-country professional development through knowledge sharing and undertaking quality improvement projects within their work environments. Although limited by the availability of the sophisticated equipment used during their training in Australia, the participants have continued to engage in learning and work on implementing changes in their approach to maternal and newborn health care.

To enable maternity care providers to work within their communities in countries like Timor-Leste in promoting positive health outcomes and reducing maternal mortality rates further culturally-safe-framework professional development programs, the support of organisations such as Rotary needs to continue. Collaborations such as the one presented in this paper provide an opportunity for health professionals in resource-limited countries to be exposed to the level of education and evidence-based practice required to work towards improving health outcomes for their local communities.

CRediT authorship contribution statement

Lisa Wirihana, Belinda Jennings, Bridget Ferguson, Adeniyi Adeleye, Rachel Chee, Kathryn Ritchie, Tanya Capper, Moira Williamson: Conceptualisation, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Rachel Smith**: Review and editing. **Moira Williamson, Lisa Wirihana, Tanya Capper:** Conceptualisation, Supervision, Writing – original draft, Writing – review & editing.

Ethical statement

Human Research Ethics Committee of the Central Queensland University, Australia provided ethical approval with a reference number of 0000024059 on 22 December 2022.

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Declaration of Competing Interest

Belinda Jennings and Adeniyi Adeleye are Rotarians and nurse academics at Flinders University and CQUniversity respectively and did not partake in all funding decisions.

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