A gap analysis of midwifery competency, pre- and in-service education for reproductive, maternal, newborn, child and, adolescent health in Lao People's Democratic Republic

Shogo Kubota,[a,*] Moe Ando,[a] Sengmany Khambounheuang,[b] Khampasong Theppanya,[b] Phouvanh Nanthavong,[b] Chankham Tengbriacheu,[c] Malouny Sisavanh,[a] Thongchan Khattiyod,[a] Daisuke Asai,[a] John Murray,[d] and Howard Sobel[d]

[a]WHO Laos, Vientiane, Lao PDR
[b]Department of Health Personnel, Ministry of Health, Vientiane, Lao PDR
[c]National Mother and Child Health Center, Department of Hygiene and Health Promotion, Ministry of Health, Vientiane, Lao PDR
[d]WHO Western Pacific Region, Manilla, Philippines

The Lancet Regional Health - Western Pacific 2024;43: 100959

Published Online xxx
https://doi.org/10.1016/j.lanwpc.2023.100959

Summary

Background Ensuring midwives deliver quality essential services requires systematic and timely updates to midwifery education based on constantly evolving global evidence and local needs. However, midwifery curricula are often not updated to incorporate new evidence, consistent with national standards. This study supported the Ministry of Health of Lao People's Democratic Republic to identify gaps in the midwifery competency framework and training packages.

Methods Stakeholder consultations and a document review were conducted to define a core package of RMNCAH interventions and care tasks that midwives should provide based on the national Essential Health Service Package (EHSP). Nationally defined midwifery competencies, the higher diploma midwifery curriculum, and in-service training packages were mapped against required interventions and care tasks. Data were used to revise midwifery education standards.

Findings Midwives were expected to provide 47 RMNCAH interventions based on the EHSP. At baseline, 7 (14.9%), 11 (23.4%) and 35 (74.5%) of the 47 interventions were included in the midwifery competency, higher diploma in midwifery curriculum, and in-service training materials, respectively. After revision, the midwifery competency framework included 42 of 47 interventions (89.4%). The data are currently being used to review and update the national midwifery pre-service diploma curriculum.

Interpretation This analysis enabled the Ministry to identify RMNCAH content gaps in national midwifery education standards and align them with the EHSP. Regular use of a quantitative approach to review educational content is essential to ensure standards are consistent with changing evidence. The approach has potential application to other service areas, cadres, and countries.

Funding Korea Foundation for International Healthcare (KOFIH) supported research operation.

Keywords: Midwifery; Competencies; Education; Essential health service; Gap analysis

Introduction

Midwives are key providers of pre-pregnancy, antenatal, labor, birth, post-partum, and family planning care.[1] In many countries with limited human resources, midwives also provide child and adolescent health services.[2–4] Therefore, up-to-date education for midwifery is indispensable for providing quality essential health services to women and children.[5,6]

In Lao People's Democratic Republic (Lao PDR), the coverage of essential reproductive, maternal, newborn, child, and adolescent health (RMNCAH) interventions has increased significantly in recent years. For example, pregnant women receiving at least four antenatal care visits and skilled delivery assistance from a doctor, nurse, midwife or auxiliary nurse increased from 36.9% to 41.5% in 2012 to 62.2% and 64.4% in 2017, respectively.

DOI of original article: https://doi.org/10.1016/j.lanwpc.2023.100960
*Corresponding author.
E-mail address: kubotas@who.int (S. Kubota).
Translation: For the Lao translation of the abstract see Supplementary Materials section.

Research in context

Evidence before this study

Midwives in low- and middle-income countries are often important providers of primary health care. However, significant under-investment in midwifery pre-service education forces many countries rely on ad hoc and unsustainable repeated in-service trainings to address skill gaps already present at the time of graduation. One common gap is that midwifery pre-service education curriculums are not updated regularly to include key evidence-based interventions and therefore not responsive to everchanging global evidence nor to local needs. We wished to determine whether the national midwifery competencies, pre-service education curriculum and in-service training guidelines in Lao PDR supported the delivery of key reproductive, maternal, newborn, child and adolescent health (RMNCAH) interventions. We found no data from any country in the Western Pacific Region, including Lao PDR, on the content of midwifery education curricula or in-service training guidelines and their alignment with evidence-based standards.

Added value of this study

This study developed a systematic method for quantifying RMNCAH interventions in the essential health service package (EHSP) in Lao PDR that must be delivered by midwives and determining whether nationally defined competencies, the preservice curriculum and in-service training guidelines included these interventions. The study found that at baseline, 7 (14.9%), 11 (23.4%) and 35 (74.5%) of the 47 interventions were included in the midwifery competencies, higher diploma in midwifery curriculum, and in-service training materials, respectively. This allowed the Ministry of Health (MoH) to revise the midwifery competencies to include 42 of 47 interventions (89.4%). The pre-service midwifery curriculum is under revision. This study demonstrated effective way to systematically identify and narrow gaps between EHSP and education contents.

Implications of all the available evidence

This quantitative analysis found significant education gaps for services midwives are expected to provide. Similar gaps are likely to exist for other service areas, health worker cadres and countries. The method should be considered as an approach to improving up-to-date educational content for healthcare workers. The database of interventions created through this analysis can be updated as the global evidence-base and national EHSP change, and reviews done regularly to ensure core midwifery skills reflected these changes in a timely manner. This provides countries with a tool for systematic and regular evidence-based update of education contents. The method should be applied for other service areas, health worker cadres and countries and tested its generalizability. Ensuring that educational content includes all key interventions is one factor important for improving quality of care. However, there are a number of factors that must be considered to ensure that training is effective and that and knowledge and skills are translated into practice. These include midwifery regulatory standards, health system gaps, and socio-cultural, economic and professional barriers. Whether shortening of the time from new evidence to education content also shortens the time to practice changes should be assessed.

However, the quality of RMNCAH care has remained sub-optimal. In 2017, only 29.2% of pregnant women had blood pressure, urine and blood samples taken at antenatal care visits. Similarly, despite rising levels of skilled delivery, only 16.8% of newborns received immediate skin-to-skin contact at the time of birth and 41.3% had the first bath delayed for at least 24 h.[7]

The Lao PDR Health Sector Strategy and Framework 2016–2025 calls for medical staff shortages to be filled by midwives and nurses.[8] Priority was given to midwives because of a national focus on improving the availability of skilled birth care. For this reason, Lao PDR invested in midwifery education, in particular through developing and strengthening midwifery diploma education and establishing a midwife association.[9,10] Optimizing the quality RMNCAH services delivered by midwives remains an essential component of the national strategy and action plan on RMNCAH 2016–2025.[11]

The Ministry of Health (MoH) in Lao PDR has defined essential clinical interventions that are expected to be provided at healthcare facilities in the Essential Health Service Package (EHSP).[12] Included interventions were selected based on global evidence with adaptations to ensure they could be implemented using local systems to maximize efficiency, equity, acceptability, and feasibility. The content of the EHSP provides the technical standards on which program managers base decisions about facility system needs such as skilled providers, medicines, equipment, and infrastructure. Similarly, required competencies for healthcare providers should support delivery of services in the EHSP.

In Lao PDR, midwives are registered under the Health Professional Council that was established in 2017 under ministerial decree.[13] To be registered, midwifery graduates who have completed at least three years of higher diploma midwifery education need to pass a national exam to obtain a license. The license is valid for 5 years and license renewal is required every 5 years. Licensing began in 2020, and the MoH plans to start a Continuous Professional Development (CPD) system in 2024, which will be the mechanism for implementing license renewal. Updating the knowledge and skills of health care professionals, including midwives, has been dependent on ad-hoc in-service trainings mostly supported by development

partners. The CPD system is expected to merge and reorganize existing in-service training content into an integrated in-service educational package for midwives. National Competencies for Registered Midwives provides reference to both pre-service and in-service education.

The technical basis for both pre-and in-service educational content in Lao PDR is contained in the National Competencies for Registered Midwives (national competencies).[14] Timely updates to the national competencies, based on global evidence-based standards such as Essential Competencies for Midwifery Practice of the International Confederation of Midwives,[15] with adaptation to the national context, is therefore critical to ensuring that midwifery education gives midwives the skills they need.[16,17] Similarly, midwifery pre-service educational content must be regularly updated based on emerging data. However, in Lao PDR, as in other low- and middle-income countries (LMICs), midwifery curricula are often not updated to incorporate new evidence, consistent with national standards,[18] nor responsive to local practice needs.[19–22] Further, there is significant under-investment in midwifery education and training, with educators often lacking skills, and education bodies insufficiently equipped.[23–27] Limited evidence on the effectiveness of pre- and in-service midwifery education in LMICs limits the impetus to drive change.[17,28] These limitations force many countries to rely on ad hoc and unsustainable in-service trainings to address skill gaps.[29–32] Although some methods have been reported to improve the timeliness and relevance of curriculum updates, uniformly applicable approaches that can be used across different settings have not yet been reported.[33,34] Development and application of a method to ensure systematic and timely updates of midwifery educational content remains an important priority in Lao PDR.

This study developed a method for systematically identifying gaps in the National Competencies for Registered Midwives, the Higher Diploma in Midwifery Curriculum (last updated in 2015) and in-service training materials by comparing them with the national Essential Health Service Package (EHSP) and national clinical standards.[12,14,35] This is the second of two papers analyzing upstream support for midwives in Lao PDR, with the first focusing on regulatory gaps.[36]

Methods

Document search

A document search and review of national clinical standards, guidelines and in-service training materials on RMNCAH was conducted in 2021 using methods described previously to identify essential RMNCAH interventions and care tasks.[36]

Document review

The national EHSP was used to identify essential RMNCAH interventions in Lao PDR.[12] RMNCAH interventions were defined as evidence-based practices or treatments demonstrated to prevent illness and death and improve health outcomes across the lifecycle (pre-pregnancy, antenatal, birth, postnatal, child, and adolescent periods). National clinical standards, guidelines and training materials identified in the document search were used to define detailed care tasks that midwives should be capable to conduct to deliver interventions in the EHSP in all clinical settings, including primary and hospital care, either working alone or with physician support. Care tasks were defined as individual clinical actions required to deliver an intervention. Care tasks were organized into previously defined practice categories adapted from globally accepted international norms.[15,16]

Three education standard gap analyses were conducted.

Gap analysis 1: identify national competency gaps (pre- and post-revision of the National Competencies for Registered Midwives)

The National Competencies for Registered Midwives in Lao PDR (2015) was used to define midwifery knowledge, skills, attitudes and behaviors currently required in all practice settings.[14] The national midwifery competencies were mapped against the care tasks required by midwives to deliver essential RMNCAH interventions identified in the EHSP. If the knowledge, skills or behaviors described in the national competencies did not include an intervention or all care tasks required to deliver an intervention, then the intervention was considered to be not fully supported by the national midwifery competencies. All standards were reviewed by two different reviewers; with disagreement in classification adjudicated by a third-party observer.

The MoH, the nursing and midwifery board of the Health Professional Council and the Lao Midwife Association revised the national midwifery competencies in 2021, using gap analysis data to decide whether additional interventions or care tasks should be added.[37] Possible additions were cross-checked against international midwifery standards[15] and the updated Scope of Midwifery Practices in Lao PDR,[38] which was revised based on the regulatory gap analysis conducted previously.[36] The gap analysis was repeated after the revision of the national competencies.

Gap analysis 2: identify pre-service curriculum gaps

The primary three-year basic midwifery course in Lao PDR, the Midwifery Higher Diploma, was used to define the current pre-service educational content for midwives.[35] The curriculum was mapped against the essential RMNCAH interventions and care-tasks required to deliver the EHSP. If an intervention was not included in the curriculum or was included but without all care-tasks required for delivery, then the intervention was considered to be not fully supported.

Gap analysis 3: identify in-service training gaps

All identified in-service training materials were mapped against the essential RMNCAH interventions and care tasks required to deliver the EHSP. If an intervention was not included in training materials or was included but without all care-tasks required for delivery, then the intervention was not fully supported.

Ethics approval

This study obtained an ethical approval from the National Ethics Committee for Health Research in Lao PDR (Submission ID: 2021.52) and the University of Tokyo (Registration number: 2021213NI). In Lao PDR, the MoH classified the consultations and document review as a part of the implementation of the national strategy and action plan on RMNCAH 2016–2025. The MoH advised no informed consent was necessary from individuals to identify existing national standards and guidelines.

Role of the funding source

The funding was used for operational cost of the analysis. The funder had no role in the study design, data collection, data analysis, data interpretation, or writing of the report.

Results

Define and review RMNCAH interventions that are expected to be provided by midwives

The national EHSP contained 100 health interventions, of which 47 (47%) were related to RMNCAH. The document review yielded 18 national standards, guidelines and national standard training materials (Box 1), from which 1227 care tasks were identified as necessary to deliver the 47 RMNCAH interventions.

Gap analysis 1: identify national competency gaps

Of the 1227 care tasks necessary to deliver the 47 RMNCAH interventions, 627 (51.1%) were included in the national midwifery competencies either as "knowledge" or "skill", fully supporting 7 of 47 (14.9%) interventions. Competency gaps were found across the continuum of care for RMNCAH services, with many interventions not fully supported by approved care tasks (Tables 1 and 2).

Competency revisions resulted in inclusion of 42/47 (89.4%) of the essential RMNCAH service interventions and 1138/1227 (92.7%) of the care tasks in the national midwifery competencies. Advanced sick childcare such as management of neonatal respiratory distress syndrome, as well as medical abortion after 12 weeks of gestational age, and surgical abortion were not included in the revision because the Lao Association of Midwives considered them to be outside the scope of midwifery practice in Lao PDR.[38] (Table 1, Table 3).

Gap analysis 2: identify pre-service curriculum gap

The curriculum of the higher diploma in midwifery included 823/1227 (67.1%) care tasks and fully supported delivery of 11/47 (23.4%) of essential RMNCAH interventions (Tables 1 and 4). While the national midwifery competencies were "developed primarily for the national exit examination of Bachelor and/or Diploma Degree in Midwifery and used to develop curriculum for midwifery,"[14] significant differences from the curriculum were noted (Tables 2 and 4). Interventions included in the national midwife competencies but not fully covered in the curriculum included abortion care, primary care for sick children (integrated management of childhood illness), basic emergency obstetric care, postpartum and postnatal care and preventive prescriptions such as weekly iron folic acid supplementation for women of reproductive age, and calcium supplementation at antenatal care. Interventions included in the curriculum but not fully included in national midwife competencies were management of sexually transmitted infections, management of pregnancy complications, caesarian section supportive care, kangaroo mother care, and well childcare.

Gap analysis 3: identify in-service training gaps

In-service training materials supported 1211/1227 (98.7%) of care tasks required to deliver 35 of the 47 (74.5%) RMNCAH interventions (Tables 1 and 5). Interventions not supported by in-service standards, were clustered in particular service areas, with no training materials on postnatal care identified.

Discussion

This analysis of midwifery education standards in Lao PDR revealed that the national midwifery competencies, pre-service diploma curriculum, and in-service training materials supported delivery of 14.9%, 23.4%, and 74.5% respectively of essential RMNCAH interventions in the EHSP. Midwives entering the workforce were therefore unprepared by their basic training to deliver most evidence-based interventions necessary to ensure availability and quality of services. These gaps were previously filled by providing in-service trainings, which is inefficient, unsustainable and not comprehensive as seen from the example of lacking in-service training material on postnatal care. A systematic, regular and timely mechanism is required to review and identify essential RMNCAH interventions that should be provided by midwives and competencies needed to deliver them. Further, data must be used to guide development of both pre- and in-service educational content to ensure consistency and to maximize the technical skills of the midwifery workforce.[17]

In Lao PDR, this data-driven approach was embraced by the MoH, the Nursing and Midwifery Board of the

Box 1.
National standards, guidelines, and in-service training materials identified for defining essential RMNCAH care tasks, Lao PDR, 2021.

- National Adolescent and Youth Friendly Service Guideline (2018)
  Available at: https://drive.google.com/file/d/1uDY_rGJ3MiyNolTIFrP9dde2lAmQ1Ibd/view
- National Adolescent and Youth Friendly Service training material (2017)
- Job aid for Adolescent Youth Friendly Service providers (2019)
  Available at: https://drive.google.com/file/d/1H2Mw442LLzDbPeXNpidRMSQqDQyj4kYu/view
- Family Planning A Global Handbook for Providers Third Edition (2018)
  Available at: https://drive.google.com/file/d/1JX4S3IJNKO2ecUUT-7sVxQT4Pav3FIx8/view
- Family Planning Training Package (2016)
- Lao national STI guideline: manual of treatment for sexual transmitted infection diseases (2018)
  Available at: https://drive.google.com/file/d/1wNmTWRITjxelonx8Wp0OUpJxH6VWdy2n/view
- Unsafe Abortion Prevention and Care Practical Guideline for Health Workers (2016)
  Available at: https://drive.google.com/file/d/10jL_gXHUHzwmYMr-sndGCCvDtF4Jn0oK/view
- The training on prevention of unsafe abortion (2019)
- Guidelines and Reference book on Antenatal Care and Postnatal Care (2018)
  Available at: https://drive.google.com/file/d/1zzJzSA7xntRHinXW4MrNizPli08Hz3MQ/view
- Antenatal Care coaching (training material) (2020)
- Participant manual on health center training on integrated essential MNCH services (2021)
- Pocketbook on Essential Care for Childbirth and Maternal Complications (2020)
  Available at: https://drive.google.com/file/d/1AGgLXsdpoYkF7VIWj06PjtVa1jWGQDGq/view
- Intrapartum Care/Emergency Obstetric Care training module material (2020)
- Early essential newborn care (EENC): clinical practice pocket guide (2014)
  Available at: https://drive.google.com/file/d/1imH75oVuoDUgknSZrIkwYkfBtHMjvvne/view
- Introducing and sustaining EENC in hospitals: Kangaroo Mother Care for preterm and low-birthweight infants (2018)
  Available at: https://drive.google.com/file/d/1E4Gym8RfsgT4UCLAF-sMZ_x3gapuBe5b/view
- Integrated Management of Childhood Illness Chartbook (2018)
  Available at: https://drive.google.com/file/d/1DnVAzpSz-MKM2FBRHeR22BZeDAfzsOWm/view
- Community Integrated Management of Childhood Illness Job aid (2019)
- Pocketbook of Hospital Care for Children 2nd edition (2013)
  Available at: https://drive.google.com/file/d/158e8yWbuF1JtikTihIXbpbATygkFemR3/view

Health Professional Council and the Lao Midwife Association Board, who were responsible for reviewing identified gaps, and deciding which competencies should be revised based on the midwifery scope of practice.[38] This, in turn, allowed alignment with the EHSP. Consequently, the proportion of essential RMNCAH interventions incorporated into the national midwifery competencies rose from 14.9% to 89.4%.[37] The data are currently being used to review and update the national midwifery pre-service diploma curriculum as well.

This gap analysis methodology helped policymakers to make evidence-informed changes in educational content. By breaking down interventions into care tasks and mapping education standards to these care tasks, gaps were easily explained, and identified, which had previously been unclear. Quantification and visualization of gaps in educational standards allowed rapid data-based policy decisions, thereby increasing the likelihood that they will be supported and integrated into core education content.

When content gaps were compared between the national midwifery competencies (Table 2), the pre-service education curriculum (Table 4), in-service training materials (Table 5), the magnitude and patterns of the gaps were distinctive. Education gaps tended to be grouped in service areas along the continuum of care (shown as "horizontal" red and yellow cells in Tables 4 and 5). These gaps, noted in areas such as sick child management and adolescent health, reflected services that had not yet been adopted as core midwifery competencies. Selective practice gaps were also noted across the continuum of care and in clinical care areas, with no apparent pattern. This likely reflects the lack of a mechanism for timely updates to align with continuously changing evidence and national standards. Interventions included in the EHSP and national clinical standards after 2015 (and reflected in 16 out of 18 in-service training documents) were not included in the national midwifery competencies and the pre-service education curriculum. This time lag in preservice curriculum updates is consistent with a 2016 global report, which found only half of 73 countries had updated their midwifery curriculum the previous three years.[18]

It should also be noted that the national midwifery regulations (Lao PDR Midwifery Scope of Practice), the legal basis for practice, must also be aligned with the EHSP. Regulatory gaps in Lao PDR were analyzed in

Service area	Number of interventions and care tasks in the EHSP	Interventions and care tasks fully included in National midwife competencies		Interventions and care tasks fully included in midwifery pre-service higher diploma curriculum N (%)	Interventions and care tasks fully included in in-service training guidelines for midwives N (%)
		Pre-revision N (%)	Post-revision N (%)		
Adolescent, Pre-pregnancy, Sexual health care	Interventions, 11	1 (9·1%)	11 (100%)	2 (18·2%)	9 (81·8%)
	Care tasks, 158	105 (66·4%)	158 (100%)	128 (81%)	156 (98·7%)
Safe abortion care	Interventions, 5	1 (20%)	3 (60%)	0 (0%)	3 (60%)
	Care tasks, 122	79 (64·8%)	104 (85·2%)	0 (0%)	120 (98·4%)
Antenatal care	Interventions, 10	0 (0%)	10 (100%)	3 (30%)	8 (80%)
	Care tasks, 192	127 (66·1%)	192 (100%)	147 (76·6%)	190 (99·0%)
Intrapartum care	Interventions, 9	2 (22·2%)	9 (100%)	2 (22·2%)	8 (88·9%)
	Care tasks, 232	156 (67·2%)	232 (100%)	139 (59·9%)	231 (99·6%)
Postpartum, postnatal care	Interventions, 2	1 (50%)	2 (100%)	1 (50%)	0 (0%)
	Care tasks, 19	18 (94·7%)	19 (100%)	5 (26·3%)	14 (73·7%)
Newborn care	Interventions, 3	1 (33·3%)	3 (100%)	1 (33·3%)	3 (100%)
	Care tasks, 54	48 (88·9%)	54 (100%)	33 (61·1%)	54 (100%)
Childcare (Well child, Sick child)	Interventions, 7	1 (14·3%)	4 (57·1%)	2 (28·6%)	4 (57·1%)
	Care tasks, 450	94 (20·9%)	379 (84·2%)	371 (82·4%)	446 (99·1%)
Total (%)	Interventions, 47	7 (14·9%)	42 (89·4%)	11 (23·4%)	35 (74·5%)
	Care tasks, 1227	627 (51·1%)	1138 (92·7%)	823 (67·1%)	1211 (98·7%)

Table 1: **RMNCAH Interventions and care tasks in the national EHSP fully supported by national midwifery competencies (before and after revision), pre-service education curriculum and in-service training guidelines, Lao PDR, 2021.**

our previous paper.[36] In contrast to education gaps identified here, midwifery practice regulation gaps occurred more commonly by clinical practice categories (oriented "vertically" in mapping summary tables). Thus, many regulatory gaps could be addressed by adding general practice categories into the revised Lao PDR Scope of Practice. For example, adding ordering and conducting tests and prescribing preventive medicines legally allowed midwives to provide many interventions, and improved alignment with the EHSP. Adding general practice categories to support the delivery of interventions was relatively simpler than updating education standards, where gaps occurred more frequently across all service areas, requiring a complete review and revision of the clinical care standards.

In-service training content gaps also tended to be grouped in service areas. This is because these materials are usually developed to deliver a set of targeted interventions in one area of clinical practice. For example, postpartum care in-service training materials were not identified, reflected on the gap across all practice categories in this service area. However, unlike the national midwifery competencies and the pre-service education curriculum, in-service training materials had fewer sporadic gaps and much better alignment with care tasks required to deliver interventions (74.5% of RMNCAH care tasks covered). Three primary reasons may account for this better alignment. First, in-service training materials were developed by program area and not necessarily linked to particular cadres of health worker. This led to more comprehensive inclusion of care tasks, regardless of health worker category or skill level. In contrast, the national competencies and pre-service education curriculum were limited by the Lao Scope of Midwifery Practice regulations. Second, many in-service training materials in Lao PDR are developed by the National RMNCAH Committee and professional associations using international guidelines; in many cases they become the technical basis for national standards. For example, a detailed protocol for antenatal care services was developed as an in-service training

Target population	Service area	# of interventions fully covered by National Competencies	Assessment						Interventions in normal course			Interventions in abnormal course			
			History taking	Physical exam	Test			Diagnosis	Education, counselling advice	Preventive prescription and its administration	Non-pharmacological intervention	Education, counselling advice	Curative prescription	Administer medicine	Non-pharmacological intervention
					Order	Conduct	Interpret								
Pre-pregnancy Adolescent	Adolescent /Pre-pregnancy /Sexual Health Care	1/11													
Maternal	Safe Abortion Care	1/5													
	Antenatal Care	0/10													
	Intrapartum Care	2/9													
	Postpartum / postnatal care	1/2													
Newborn	Newborn Care	1/3													
Child	Well Child Care *	1/7													
	Sick Child Care *														
	Advanced Sick Child Care *														
	Total	7/47 (14·9%)													

Mentioned	All care tasks required to deliver the intervention are included as "knowledge" or "skill" in the curriculum
Partially mentioned	Some care tasks required to deliver the intervention are included as knowledge or skill in the curriculum
Not mentioned	No care tasks required to deliver the intervention are included as knowledge or skill in the curriculum.
Undefinable	Care tasks of the practice category in the service area have not been defined by existing standards and guidelines

*National Competencies for Registered Midwives limits the target age of children to two months of age.

Table 2: **RMNCAH interventions in the national EHSP included in the national midwifery competencies before revision, Lao PDR, 2021.**

Target population	Service area	# of interventions fully covered in the National Competencies	Assessment						Interventions in normal course			Interventions in abnormal course			
			History taking	Physical exam	Test			Diagnosis	Education, counselling advice	Preventive prescription and its administration	Non-pharmacological intervention	Education, counselling advice	Curative prescription	Administer medicine	Non-pharmacological intervention
					Order	Conduct	Interpret								
Pre-pregnancy Adolescent	Adolescent /Pre-pregnancy /Sexual Health	11/11													
	Care														
Maternal	Safe Abortion Care	3/5													
	Antenatal Care	10/10													
	Intrapartum Care	9/9													
	Postpartum Care (including Postnatal Care)	2/2													
Newborn	Newborn Care	3/3													
Child	Well Child Care *	4/7													
	Sick Child Care *														
	Advanced Sick Child Care *														
	Total	42/47 (89·4%)													

Mentioned	All care tasks required to deliver the intervention are included as "knowledge" or "skill" in the curriculum
Partially mentioned	Some care tasks required to deliver the intervention are included as knowledge or skill in the curriculum
Not mentioned	No care tasks required to deliver the intervention are included as knowledge or skill in the curriculum.
Undefinable	Care tasks of the practice category in the service area have not been defined by existing standards and guidelines

*National Competencies for Registered Midwives limits the target age of children to two months of age.

Table 3: **RMNCAH interventions in the national EHSP included in national midwifery competencies after revision, Lao PDR, 2021.**

Target population	Service area	# of interventions fully covered by the curriculum	Assessment						Interventions in normal course			Interventions in abnormal course			
			History taking	Physical exam	Test			Diagnosis	Education, counselling advice	Preventive prescription and its administration	Non-pharmacological intervention	Education, counselling advice	Curative prescription	Administer medicine	Non-pharmacological intervention
					Order	Conduct	Interpret								
Pre-pregnancy Adolescent	Adolescent / Pre-pregnancy /Sexual Health Care	2/11													
Maternal	Safe Abortion Care	0/5													
	Antenatal Care	3/10													
	Intrapartum Care	2/9													
	Postpartum Care (including Postnatal Care)	1/2													
Newborn	Newborn Care	1/3													
Child	Well Child Care	2/7													
	Sick Child Care														
	Advanced Sick Child Care														
	Total	11/47 (23·4%)													

Mentioned	All care tasks required to deliver the intervention are included as "knowledge" or "skill" in the curriculum
Partially mentioned	Some care tasks required to deliver the intervention are included as knowledge or skill in the curriculum
Not mentioned	No care tasks required to deliver the intervention are included as knowledge or skill in the curriculum.
Undefinable	Care tasks of the practice category in the service area have not been defined by existing standards and guidelines

*1 The document limits the target age of children to two months of age.

Table 4: **RMNCAH interventions in the national EHSP included in the curriculum of higher diploma in midwifery, Lao PDR, 2021.**

Target population	Service area	# of interventions fully covered in in-service training materials	Assessment						Interventions in normal course			Interventions in abnormal course			
			History taking	Physical exam	Test			Diagnosis (abnormal)	Education, counselling advice	Preventive prescription and its administration	Non-pharmacological intervention	Education, counselling advice	Curative prescription	Administer medicine	Non-pharmacological intervention
					Order	Conduct	Interpret								
Pre-pregnancy Adolescent	Adolescent / Pre-pregnancy	9/11													
	/Sexual Health Care														
Maternal	Safe Abortion Care	3/5													
	Antenatal Care	8/10													
	Intrapartum Care	8/9													
	Postpartum Care (including Postnatal Care) *	0/2													
Newborn	Newborn Care,	3/3													
Child	Well Child Care	4/7													
	Sick Child Care														
	Advanced Sick Child Care														
	Total	35/47 (74·5%)													

Mentioned	All care tasks required to deliver the intervention are included as "knowledge" or "skill" in the curriculum
Partially mentioned	Some care tasks required to deliver the intervention are included as knowledge or skill in the curriculum
Not mentioned	No care tasks required to deliver the intervention are included as knowledge or skill in the curriculum.
Undefinable	Care tasks of the practice category in the service area have not been defined by existing standards and guidelines

*In-service training material on postpartum, postnatal care was not identified. Some contents of postpartum care are covered in intrapartum care training.

Table 5: **RMNCAH interventions in the national EHSP included in midwifery in-service training materials.**

course using WHO 2016 guidelines and subsequently became the national standard, contributing to higher alignment. Production of in-service training materials therefore became an indirect method of updating or developing national standards. Third, in-service training materials were more continuously updated compared to the national midwifery competencies or the pre-service curriculum. Sixteen of 18 (88.9%) in-service training materials were revised or developed after finalization of the national midwifery competencies in 2015. Nevertheless, 25.5% of interventions in the EHSP were not included in in-service training materials. This suggests that development of in-service training materials still needs better coordination between technical stakeholders, national program managers and development partners, as well as better linkage with the EHSP. This is consistent with a previous report.[39] An additional advantage of in-service training is that it is often delivered to a multidisciplinary audience and therefore closer to the needs of actual practice, where interdisciplinary teamwork is required.[40] In-service methods can also have advantages that increase the likelihood of practice change. By linking on-the-job coaching with environmental, workflow, staffing and other systems upgrades to support adoption of new practices, they can use multistakeholder cooperation to facilitate better adoption in clinical settings.[41] Adopting multidisciplinary training in pre-service education is an area that should be further explored.[42,43]

Never-the-less, reliance on in-service training to complement gaps in pre-service education poses several problems. The pattern observed in Lao PDR results in a reliance on unsustainable and inefficient repeated in-service trainings to fill competency shortfalls.[29,30,44] As seen in this analysis, some service areas may not be included, with training often opportunistic and limited by available funding and donor's interests.[29,30] Further, gaps in the regulatory framework, as shown previously, mean that in-service trainings often introduce care tasks that midwives are not legally supported to provide as sole providers.[36] This effect is compounded by significant time delays between the update of regulations and emerging global evidence and national standards.

Better long-term investments are needed in sustainable education. Incorporating regular reviews and updates to midwifery competencies and pre-service training should be followed by improved post-licensure education, board certification and license renewal systems, and a legislated continuous professional development program.[5] Accreditation criteria for health education institutes can also help ensure that midwifery competencies are updated in a more sustainable, timely and continuous fashion.[23] These areas will need to be progressively added in Lao PDR to ensure sustainability and maintain quality.

This analysis enabled detailed mapping of national competencies and training materials against required national essential health services and clinical standards at one point in time. However, interventions and care tasks must be updated when new evidence, and national and global standards become available. This cycle of mapping and updating competencies and education materials must then become routine. This simple tool and method can support systematic and rapid reviews and revisions of educational content, thereby narrowing the time lag between emerging evidence and updated midwifery practice. Next a mechanism is needed for the MoH, the Health Professional Council and the Lao Midwife Association to periodically map, conduct gap analysis, and update the national competencies, pre-service education curriculum and contents for continuing professional development.

Several limitations to this study of midwifery competencies and training are noted. First, comparison of national competency standards and curriculum content with care tasks required interpretation that may differ by reviewer. The national midwifery competencies were particularly open to interpretation as many were non-specific. To mitigate this problem, all standards were reviewed by two different reviewers; with disagreement in classification adjudicated by a third clinical reviewer. Second, detailed mapping of care tasks in some service areas was not possible because limited national standards or guidelines were available (for example postnatal care practices and well child care). As a next step, when clinical standards and guidelines are developed or updated, gap analyses in these areas can be conducted. However, it should be noted that the interventions themselves remain in the EHSP, and therefore a part of national midwifery standards. Third, significant barriers exist between defining midwifery competencies, including them in pre-service training and improving midwifery practice on the ground. Narrowing pre-service education gaps means adding new content to the national competencies and the curriculum. These changes will require significant changes to organization, time allocation, faculty skills and possibly faculty numbers. Methods of teaching may need to be adapted to allow more clinical practiced based experience.[45] Similarly, other systems and socio-economic factors influence whether midwives are able to practice even when training meets competency standards. An analysis to review gaps between midwifery standards and facility practices is a planned third study in this series, which is expected to help define health system barriers and solutions required to develop enabling environments for midwifery practice. Lastly, this analysis does not consider a wider discussion of human resources planning beyond midwives. Midwifery roles and responsibilities overlap with those of other healthcare professionals such as doctors and nurses; and efficient care delivery requires collaboration and coordination between them. Similar analyses with other cadres will allow a more comprehensive human resources strategy

to be developed. This is important to ensure efficient use of human resources, appropriate staff allocation and task division.[5] Therefore an ongoing process is required to ensure that the skill mix of different cadres are complementary and contribute most efficiently to improving access to care.

Conclusion

This analysis of midwifery educational standards in Lao PDR revealed that the national midwifery competencies, the pre-service diploma curriculum, and in-service training materials supported delivery of 14.9%, 23.4% and 74.5% respectively of essential RMNCAH interventions in the EHSP. The analysis developed a method for analyzing gaps between national education standards and the EHSP by defining care tasks required to deliver interventions and mapping education standards against them. Data were used to update national midwifery competencies, which increased the proportion of care tasks needed to deliver essential interventions included from 14.9% to 89.4%. The preservice education curriculum for midwifery is currently under revision to narrow the identified gaps. RMNCAH interventions and care tasks that should be delivered by midwives should be continuously updated and incorporated into educational competencies and training content to ensure that midwives have the up-to-date knowledge and skills to deliver essential services. The approach has potential application to other service areas, cadres, and countries.

Contributors

Kubota Shogo: conceptualization, methodology, data verification, writing (original draft).

Moe Ando: methodology, investigation, data curation, data verification, writing (review and editing).

Sengmany Khambounheuang: writing (review and editing).

Khampasong Theppanya: supervision, writing (review and editing).

Phouvanh Nanthavong: project administration, writing (review and editing).

Chankham Tengbriacheu: writing (review and editing).

Malouny Sisavanh: writing (review and editing).

Thongchan Khattiyod: investigation.

Daisuke Asai: writing (review and editing).

John Murray: methodology, writing (review and editing).

Howard Sobel: methodology, writing (review and editing).

Data sharing statement

A list of RMNCAH Interventions required to be delivered by midwives and inclusion status of each intervention in the national competencies, pre-service education curriculum and in-service training materials in Lao PDR is available in the Web Annex.

Declaration of interests

There is no conflict of interest to disclose.

Acknowledgements

The authors acknowledge partners involved in identifying existing relevant documents during the document search; the Ministry of Health, Nursing and Midwifery Board of the Health Professional Council and Lao Midwife Association for their engagement and leadership in revision of the national midwifery competencies; and United Nations Population Fund (UNFPA) for ongoing support to the government.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lanwpc.2023.100959.

References

1 Nove A, Friberg IK, de Bernis L, et al. Potential impact of midwives in preventing and reducing maternal and neonatal mortality and stillbirths: a Lives Saved Tool modelling study. *Lancet Global Health*. 2021;9(1):e24–e32.
2 ten Hoope-Bender P, Lopes ST, Nove A, et al. Midwifery 2030: a woman's pathway to health. What does this mean. *Midwifery*. 2016;32:1–6.
3 O'Loughlin F, Phangmanixay S, Sisouk K, et al. Integrated management of neonatal and childhood illness training in Lao PDR: a pilot study of an adaptable approach to training and supervision. *Am J Trop Med Hyg*. 2021;105(6):1618–1623.
4 Fenta EH, Endris BS, Mengistu YG, et al. Landscape analysis of nutrition services at Primary Health Care Units (PHCUs) in four districts of Ethiopia. *PLoS One*. 2020;15(12):e0243240.
5 World Health Organization. *Global strategy on human resources for health: workforce 2030*. Geneva: World Health Organization; 2020.
6 World Health Organization. *Global strategic directions for nursing and midwifery 2021-2025*. Geneva: World Health Organization; 2021.
7 Lao Statistics Bureau. *Lao social indicator survey II 2017, survey findings report*. Vientiane, Lao PDR: Lao Statistics Bureau and UNICEF; 2018.
8 Ministry of Health. *Health sector reform strategy and framework till 2025*. Vientiane: Lao PDR: Ministry of Health; 2016.
9 Lao Midwife Association. *History of Lao midwifery. Vientiane, Lao PDR: Lao midwife association*; 2020. Available from: https://sites.google.com/view/lao-association-of-midwives-la. Accessed August 13, 2022.
10 UNFPA. *100 Years of progress: celebrating midwifery and launch of the Lao association of midwife. Vientiane, Lao PDR: UNFPA*; 2022. Available from: https://lao.unfpa.org/en/news/100-years-progress-celebrating-midwifery-and-launch-lao-association-midwife. Accessed August 13, 2022.
11 Ministry of Health. *National strategy and action plan for integrated service on reproductive, maternal, newborn, child, and adolescent health 216-2025*. 3rd ed. Vientiane, Lao PDR: Ministry of Health; 2022.
12 Ministry of Health. *Essential health service packages 2023. Vientiane, Lao PDR*. Ministry of Health; 2023.
13 Ministry of Health. *Ministerial decree on health professional Council. Vientiane, Lao PDR*. Ministry of Health; 2017.
14 Ministry of Health. *National competencies for registered midwives in Lao PDR. Vientiane, Lao PDR*. Ministry of Health; 2015.
15 International Confederation of Midwives (ICM). *Essential competencies for midwifery practice 2019 UPDATE*. ICM; 2019. Available from: https://www.internationalmidwives.org/assets/files/general-files/2019/10/icm-competencies-en-print-october-2019_final_18-oct-5db05248843e8.pdf. Accessed June 1, 2021.
16 Renfrew MJ, McFadden A, Bastos MH, et al. Midwifery and quality care: findings from a new evidence-informed framework for maternal and newborn care. *Lancet*. 2014;384(9948):1129–1145.
17 World Health Organization. *Strengthening quality midwifery education for Universal Health Coverage 2030: framework for action*. Geneva: World Health Organization; 2019.
18 Castro Lopes S, Nove A, Ten Hoope-Bender P, et al. A descriptive analysis of midwifery education, regulation and association in 73 countries: the baseline for a post-2015 pathway. *Hum Resour Health*. 2016;14(1):37.
19 Moller AB, Welsh J, Ayebare E, et al. Are midwives ready to provide quality evidence-based care after pre-service training? Curricula assessment in four countries-Benin, Malawi, Tanzania, and Uganda. *PLoS Glob Public Health*. 2022;2(9):e0000605.
20 Celletti F, Reynolds TA, Wright A, Stoertz A, Dayrit M. Educating a new generation of doctors to improve the health of populations in low- and middle-income countries. *PLoS Med*. 2011;8(10):e1001108.
21 Miller BM, Eichbaum Q, Brady DW, Moore DE. Aligning health sciences education with health needs in developing countries. *Acad Med*. 2011;86(11):e10.
22 Nourdadgar A, Ghaffari R, Behshid M, Ghoreishizadeh F. Comparing the professional role and tasks approved in curriculum

with the ongoing role and tasks of midwives employed in tabriz health care units. *Res Dev Med Educ*. 2017;6(1):34–44.
23 Nove A, Pairman S, Bohle LF, et al. The development of a global midwifery education accreditation programme. *Glob Health Action*. 2018;11(1):1489604.
24 Nove A, Ten Hoope-Bender P, Boyce M, et al. The State of the World's Midwifery 2021 report: findings to drive global policy and practice. *Hum Resour Health*. 2021;19(1):146.
25 Filby A, McConville F, Portela A. What prevents quality midwifery care? A systematic mapping of barriers in low and middle income countries from the provider perspective. *PLoS One*. 2016;11(5): e0153391.
26 Cancedda C, Farmer PE, Kerry V, et al. Maximizing the impact of training initiatives for health professionals in low-income countries: frameworks, challenges, and best practices. *PLoS Med*. 2015;12(6):e1001840.
27 Bogren M, Ndela B, Toko C, Berg M. Midwifery education, regulation and association in the Democratic Republic of Congo (DRC) - current state and challenges. *Glob Health Action*. 2020;13(1): 1717409.
28 Gavine A, MacGillivray S, McConville F, Gandhi M, Renfrew MJ. Pre-service and in-service education and training for maternal and newborn care providers in low- and middle-income countries: an evidence review and gap analysis. *Midwifery*. 2019;78: 104–113.
29 Bowser D, Sparkes SP, Mitchell A, et al. Global Fund investments in human resources for health: innovation and missed opportunities for health systems strengthening. *Health Policy Plan*. 2014;29(8):986–997.
30 Vujicic M, Weber SE, Nikolic IA, Atun R, Kumar R. An analysis of GAVI, the Global Fund and World Bank support for human resources for health in developing countries. *Health Policy Plan*. 2012;27(8):649–657.
31 Bluestone J, Johnson P, Fullerton J, Carr C, Alderman J, BonTempo J. Effective in-service training design and delivery: evidence from an integrative literature review. *Hum Resour Health*. 2013;11:51.
32 Jhpiego Low Dose. *High frequency: a learning approach to improve health workforce competence, confidence, and performance*. Jhpiego; 2016. Available from: https://hms.jhpiego.org/wp-content/uploads/2016/08/LDHF_briefer.pdf. Accessed August 13, 2022.
33 Burgess A, Jeffery H, Bayanbileg S, Nasalmaa E, Black K. Steps towards updating the curriculum and teaching methods in obstetrics, gynaecology and neonatology in Mongolia. *J Nurs Care*. 2016;5:347.
34 Bogren MU, Wiseman A, Berg M. Midwifery education, regulation and association in six South Asian countries–a descriptive report. *Sex Reprod Healthc*. 2012;3(2):67–72.
35 Ministry of Health. *Higher diploma in midwifery curriculum*. Vientiane, Lao PDR: Ministry of Health; 2015.
36 Kubota S, Ando M, Murray J, et al. A regulatory gap analysis of midwifery to deliver essential reproductive, maternal, newborn, child and adolescent health services in Lao People's Democratic Republic. 2023;43:100960. https://doi.org/10.1016/j.lanwpc.2023.100960.
37 Ministry of Health, Lao PDR. *National competency of midwife in Lao PDR*. 2021. Vientiane, Lao PDR.
38 Ministry of Health, Lao PDR. *Scope of midwifery practices in Lao PDR*; 2021. Vientiane, Lao PDR. https://drive.google.com/file/d/1mA5Jm6Sg15cq9FS4SZ2k2llU826U41zD/view. Accessed October 12, 2022.
39 OECD. *Implementing the OECD recommendation on policy coherence for sustainable development: guidance note*. Paris: OECD; 2021. Available from: https://www.oecd.org/gov/pcsd/pcsd-guidance-note-publication.pdf. Accessed August 13, 2022.
40 Fransen AF, van de Ven J, Banga FR, Mol BWJ, Oei SG. Multiprofessional simulation-based team training in obstetric emergencies for improving patient outcomes and trainees' performance. *Cochrane Database Syst Rev*. 2020;12(12):CD011545.
41 Tran HT, Mannava P, Murray JCS, et al. Early essential newborn care is associated with reduced adverse neonatal outcomes in a tertiary hospital in da nang, Viet Nam: a pre- post- intervention study. *eClinicalMedicine*. 2019;6:51–58.
42 Avery MD, Mathiason M, Andrighetti T, et al. Improved self-assessed collaboration through interprofessional education: midwifery students and obstetrics and gynecology residents learning together. *J Midwifery Womens Health*. 2022;67(5):598–607.
43 Avery MD, Jennings JC, Germano E, et al. Interprofessional education between midwifery students and obstetrics and gynecology residents: an American college of nurse-midwives and American college of obstetricians and gynecologists collaboration. *J Midwifery Womens Health*. 2020;65(2):257–264.
44 BioMed Central Ltd. *Improving the efficiency, effectiveness and sustainability of health worker in-service training: closing the gaps between evidence, practice and outcomes*. Human Resources for Health; 2013 [cited 2022 August 07]. Available from: https://www.biomedcentral.com/collections/IST.
45 Yigzaw T, Ayalew F, Kim YM, et al. How well does pre-service education prepare midwives for practice: competence assessment of midwifery students at the point of graduation in Ethiopia. *BMC Med Educ*. 2015;15:130.