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PERSPECTIVE

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Landscape analysis of neonatal nursing in Zambia, after five years of training

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Abstract: *Background:* Sub-Saharan Africa faces a critical shortage of trained neonatal nurses; hence, undermining progress toward the Every Newborn Action Plan target for district-level Level 2 neonatal care. Since 2021, Zambia has introduced two neonatal nursing programs (one-year post-Diploma; two-year Master's) to build a competent workforce. Scale up of training remains suboptimal due to various challenges and neonatal mortality remains a leading cause of under-five deaths.
Objective: To describe Zambia's neonatal nursing training outputs to date, assess progress against national workforce targets, and identify system gaps and pragmatic strategies to accelerate scale-up.
Approach: We synthesized program administrative data and cohort information from Lusaka College of Nursing and Midwifery (LUCON) and the University of Zambia (UNZA) and triangulated with the Zambia Paediatric Workforce Training Plan (2020–2030). Descriptive summaries cover enrolment, graduation, deployment, and faculty/preceptorship capacity.
Findings: National analysis estimated a need for 500 neonatal nurses, with a 2030 public-sector target of 250. Since 2021, 85 post-Diploma neonatal nurses have completed training, and 14 Master's graduates have been produced; 31 post-Diploma nurses are currently in training (2025). Trainees are drawn from all provinces, but deployment is uneven, with 17.6% not yet deployed to designated neonatal units. Faculty and preceptorship deficits constrain scale up. LUCON currently meets tutor needs for a class of 40 but lacks 3 clinical instructors. Master's trainees report limited supervised clinical time and delayed graduation due to research and mentorship gaps. Orientation standards are inconsistent compared with high-income benchmarks, and no established posts for neonatal nurses in the public establishment weaken retention and motivation.
Conclusions: Zambia has demonstrated early, scalable outputs in neonatal nurse training but remains off-track to meet interim milestones of 120 nurses by 2025 and 250 by 2030.
Implications for Practice and Policy: Priorities include: create funded establishment posts for neonatal nurses; adopt a Clinical Nurse Educator (CNE) model to standardize orientation and bedside teaching; expand clinical instructor capacity and protected preceptorship time; provide scholarships and fast-track pathways to complete master's research; and optimize deployment to high-need facilities to close equity gaps.

Keywords: Workforce; preceptorship; clinical nurse educator; deployment; orientation

Résumé: *Contexte:* L'Afrique subsaharienne est confrontée à une pénurie critique d'infirmiers spécialisés en néonatologie, compromettant les progrès vers les objectifs du *Every New born Action Plan* relatifs à la mise en place de soins néonatals de niveau 2 au niveau des districts. Depuis 2021, la Zambie a instauré deux filières de formation en soins infirmiers néonatals (un programme de spécialisation d'un an et un programme de master de deux ans) afin de

renforcer les compétences. Toutefois, l'extension à grande échelle de ces formations demeure insuffisante en raison de multiples contraintes, et la mortalité néonatale reste encore élevée parmi les décès des enfants de moins de cinq ans.
Objectif: Décrire les résultats de la formation en soins infirmiers néonatals en Zambie, évaluer les progrès réalisés au regard des cibles nationales de ressources humaines, et identifier les lacunes ainsique des stratégies pragmatiques pour accélérer la généralisation.
Méthodes: Nous avons synthétisé les données administratives des programmes et les informations de cohortes issues du Lusaka College of Nursing and Midwifery (LUCON) et de l'Université de Zambie (UNZA), en les confrontant aux projections du *Zambia Paediatric Work force Training Plan (2020–2030)*. Des analyses descriptives ont porté sur les effectifs inscrits, les diplômés, le déploiement et la capacité d'encadrement pédagogique et clinique.
Résultats: L'analyse nationale estime un besoin de 500 infirmiers néonatals, avec un objectif intermédiaire de 250 postes dans le secteur public d'ici 2030. Depuis 2021, 85 infirmiers spécialisés et 14 infirmiers titulaires d'un master ont été formés. En 2025, 31 infirmiers diplômés sont encore en formation. Les apprenants proviennent de toutes les provinces. Toutefois, leur déploiement demeure inégal ; 17,6 % n'étant pas encore affectés dans des unités néonatales désignées.
Les insuffisances en personnel enseignant et encadreur pratique constituent un frein majeur à l'expansion. LUCON répond actuellement aux besoins en formateurs pour des cohortes de 40 étudiants, mais présente un déficit de trois instructeurs cliniques. Les étudiants en master signalent un temps clinique supervisé limité ainsi que des retards de l'obtention du diplôme liés à des déficit en encadrement pour la recherche et le mentorat. Les standards d'orientation clinique restent hétérogènes comparativement aux références des pays à revenu élevé. En outre, l'absence de postes formellement établis pour les infirmiers néonatals dans la fonction publique compromet la rétention et la motivation professionnelle.
Conclusions: La Zambie a démontré des avancées initiales prometteuses et potentiellement extensibles dans la formation des infirmiers néonatals. Toutefois, le pays demeure en retard par rapport aux objectifs fixés à 120 infirmiers d'ici 2025 et 250 d'ici 2030.
Implications pour la pratique et les politiques publiques : les priorités stratégiques incluent: La création de postes budgétisés et officiellement reconnus pour les infirmiers néonatals; L'adoption d'un modèle d'Infirmier Clinicien Éducateur (Clinical Nurse Educator, CNE) afin de standardiser l'orientation et renforcer l'enseignement au lit du patient ;L'augmentation de la capacité d'instruction clinique et la mise en place d'un temps dédié pour l'encadrement;L'octroi de bourses et de parcours accélérés pour faciliter l'achèvement des travaux de recherche en master; L'optimisation du déploiement vers les structures à forte charge afin de réduire les inégalités territoriales.

Mots-clés: Ressources humaines en santé ; Encadrement ; Infirmier clinicien éducateur ; Déploiement ; Orientation clinique ; Soins infirmiers néonatals ; Zambie.

Introduction

Skilled workforce in neonatology is essential in reducing the high neonatal mortality rates (NMR)[1]. Research shows that having a specialised neonatal nurse on duty can decrease mortality by 1%[2]. Therefore, training neonatal nurses is of paramount importance in improving the outcome of small and sick newborns. Despite efforts to increase the numbers of neonatal nurses, the training is hindered by various factors, especially in the sub-Saharan Africa, where NMR ranks among the highest, globally. In Zambia, neonatal mortality continues to be the leading cause of death in under five children. Despite an improvement in the infant and under five mortality figures, neonatal mortality makes up 45% of all under five mortalities[3]. The NMR increased from 24/1,000 to 27/1,000 live births from 2014 to 2018[3].

However, there is an improvement, with the 2024 Zambia Demographic Health Survey (ZDHS) reporting the NMR of around 17/1,000 live births[3]. The United Nations-Inter-Agency Group for Child Mortality Estimation (UN-IGME) statistics, show that Zambia had approximately 21.99 per 1,000 live births over the same period: revealing some discrepancy in the data[4]. Nevertheless, the improvement is against the set Sustainable Development Goal (SDG) target of 12/1,000 live births by 2030[3]. The leading causes of mortality are asphyxia, prematurity, infections and congenital anomalies. This group of neonates are considered small and sick, and therefore, requiring specialised care from a skilled attendant[5].For Zambia to achieve the goal of reducing neonatal mortality and ensure that the small and sick newborns survive and thrive, trained neonatal nurses are required.

To improve the skills of health workers as a way of helping reduce NMR, the Ministry of Health (MoH) commissioned a one-year Diploma in-service neonatal nursing training in 2021 and a one-year neonatology postgraduate Diploma for medical officers (MBchB PGDip), under the Zambia College of Medicine and Surgery (ZACOMS) in 2020. Additionally, the University of Zambia (UNZA) commenced the Master of Science (MSc) programme, training neonatal nurse specialists, who are highly functioning nurses that can look after newborns as part of the multidisciplinary care team. Neonatal nursing is described by the National Association of Neonatal Nurses (NANN), as a nurse that works specifically with newborn infants, born with different problems that range from prematurity to surgical problems[6].

In the absence of specialised workforce to care for the small and sick newborns, most neonatal units are run by experienced midwives, critical care nurses, paediatric nurses and general nurses. Unfortunately, there is a high turnover of general nursing and experienced nurses in the NICU are often rotated outside the facilities without much consideration of their experience or training. Survival of ill neonates has been linked to qualified neonatal nurses[7].

The Council of International Neonatal Nurses (COINN) has been at the centre of advocating for improved newborn care, training and partners with various institutions, including the World Health Organisation (WHO)[2].The COINN has identified that in most of the countries in Africa, there is a lack of orientation for new nurses when they are assigned to work in the NICU. Further, during orientation to the NICU, most of the new nurses do not have a consistent mentor, and thus, they often learn several different ways of carrying out the same tasks. NICUs being highly specialised areas, and care of neonates differing from that of the general population, detailed orientation of new nurses to the units is very important. A survey of neonatal units in Rwanda found that orientation to neonatal units is as short as one day and a maximum of 10 days[8]. In contrast, orientation of new nurses to neonatal units in the United States of America (USA), the United Kingdoms (UK) and high-income countries takes about 12 weeks to a year [9]**.** To be qualified, a nurse needs to be oriented and trained in specific neonatal issues. Gaps surrounding orientation are, but not limited to no orientation, lack of consistency and too many mentors. Consequently, nurses who are not given a consistent and predetermined orientation do not develop skills that help them give adequate care to neonates[10]**.**

Conversely, students on the neonatal nursing MSc training programme at UNZA have identified limited neonatal nurse clinical preceptors as another gap in the orientation of nurses to NICUs. Preceptors in NICU assist to guide current didactic and clinical acquisition skills by nurses who are new to the area. In the case of students training to be neonatal nurses and specialists, they are generally placed with a qualified nurse on duty; but most often, they are left to work without supervision. This practice contributes highly to students completing their training without meeting their clinical objectives. Most often they qualify without being proficient in certain procedures because the nurse's supervising students are less qualified than students. There are key skills that are acquired when a preceptor consistently guides a student[7].

Current Situation

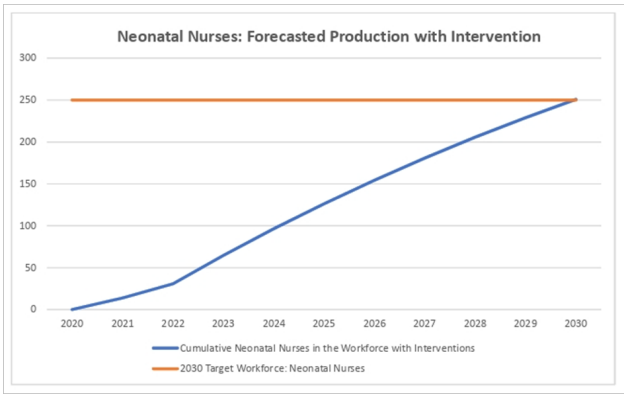
Zambia has been training neonatal nurses at Diploma and Master's level since 2021. With the help of Clinton Health Access Initiative (CHAI), the MoH created the Zambia Paediatric Workforce Training Plan 2020-2030[11]. This document contained the enrolment scale-up for neonatal nurse training programme and neonatal nurse forecasted production with Interventions, as presented in Table 1 and Figure 1.

Table 1: Neonatal Nurse Workforce 2030 Targets and Remaining Gaps

Paediatric Provider Area	Public Sector Workforce (2020)	Required Public Sector Workforce per Workload Analysis	Public Sector Workforce Gap (2020)	2030 Public Sector Workforce Target
Neonatal Nurses	0	500	500	250

Enrolment Scale-up for Neonatal Nurse Training Programme

Fig 1: Neonatal Nurses-Forecasted Production with Interventions



Source: Zambia Paediatric Workforce Training Plan 2020-2030

In-depth analysis of Neonatal Nurse Training in Zambia

The rationale for the two (advanced Diploma and Masters) programmes is as follows:

Graduates of the Diploma neonatal nurse are bedside nurses working on the neonatal units and specifically trained to look after low-risk, small and sick neonates. This training creates a critical mass of neonatal nurses at a fast rate; thus, allowing for a faster reduction of the current gap of healthcare workforce for small and sick newborns.

MSc Neonatal Nursing graduates become faculty and mentor/train other faculty for the Diploma programme, and subsequently the Bachelor of Science (BSc) in Neonatal Nursing programme.

With Paediatrician/Neonatologist support, either onsite or off site, MSc Neonatal Nurses have the capacity to run a Level 2 neonatal unit.

Post/ Advanced Diploma in Neonatal Nursing

To reach the trained neonatal nurse target of 250 by 2030, a one-year in-service Diploma training programme was established, as a pilot at Lusaka University College of Nursing and Midwifery (LUCON). The main objective of the strategy was to introduce and ensure availability of well-trained neonatal nurses.
A sub-working group consisting of members of the ment, most graduates are assigned to work in other areas as general registered nurses (RNs).

Newborn Support Zambia (a local Non-Governmental Organisation), LUCON staff and MoH, represented by the National Coordinator Neonatal Services worked to build on ideas initiated by the Lusaka-Brighton link to commence the training programme in 2021. The didactic training was at LUCON, and the clinical area was at the University Teaching Hospital (UTH), Women and Newborn Hospital; the largest neonatal care unit in the country.

Although the initial planned enrolment of 20 students in the first year followed by an increase to 40 per year had not been met, (Table 3), the programme trained a total of 14 nurses in 2021, 12 in 2022, 30 in 2023, 29 in 2024, and 31 students currently undergoing training in the 2025 academic year. The students are drawn from various provinces and countries in the region, including but not limited to Botswana and Eswatini. In the initial phase, students were taught by Postgraduate Diploma Neonatology Medical (MBchB PGDip) graduates from ZACOMS and MSc Neonatal Nursing from the UNZA. Subsequently, the graduates from the UNZA MSC programmes took over the teaching and they are currently the main trainers.
The programme is approved by the Nursing and Midwifery Council of Zambia (NMCZ) and accredited by the Higher Education Authority (HEA), and approved by the Zambia Qualifications Authority (ZAQA)-The scope of practice has been developed by the NMCZ. In line with other nursing programmes, a long-term monitoring and evaluation framework is being implemented in the training to ensure programme effectiveness and maintaining quality standards.

Fig 1 shows how the public sector workforce is expected to grow with a planned enrolment scale-up to meet the public sector health target by 2030. Table 2 shows planned enrolment numbers from 2020 to 2030, while Table 3 shows the actual number of neonatal nurses trained since 2025. It is however important to note that the total number of neonatal nurses that graduate and join the public sector workforce is lower, due to various reasons. Additionally, the trainees who are mostly government workers, return to their stations to work in the neonatal units. However, because the MoH is yet to create paid positions for neonatal nurses on the establish

Table 2: Planned advanced neonatal nurse enrolment numbers (2020-2030)

Site	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Lusaka College of Nursing	0	20	40	40	40	40	40	40	40	40	40

Table 3: Actual Numbers Trained to date 2025

Site	2020	2021	2022	2023	2024	2025
Lusaka College of Nursing	0	14	12	30	29	31 (in training)

As shown in Table 4, most participants (79.4%) were aged between 25 and 35 years, followed by 11.8% aged 36–45 years. The majority, 38.2%, enrolled in 2024, indicating an expansion of the training programme in that year. Nearly two-thirds (63.2%) started training with two to six years of work experience, while 5.9% had no work experience. A large proportion, 73.5%, reported working in neonatal units currently, suggesting effective correct deployment of graduates.

Table 4: Demographic and Professional Characteristics of Neonatal Nursing Trainees in Zambia (N=68)

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Variable	Category	n	%
Age group (years)	<25	1	1.5
	25–35	54	79.4
	36–45	8	11.8
	>45	3	4.4
Year of enrolment	2021	7	10.3
	2022	3	4.4
	2023	14	20.6
	2024	26	38.2
	2025	18	26.5
Work experience at enrolment	None	4	5.9
	Below 2 years	5	7.4
	2–6 years	43	63.2
	6–10 years	10	14.7
	Over 10 years	3	4.4
Currently working in a neonatal unit	Yes	50	73.5
	No	18	26.5

As presented in Table 5, graduates were distributed across all ten (10) provinces of Zambia, with the highest representation in Lusaka province (20.6%), followed by Southern (13.2%) and Copper belt (11.8%) provinces. This distribution reflects the concentration of graduates in tertiary and specialised neonatal care facilities within urban centres. Fewer trainees were deployed in rural and peripheral provinces such as Muchinga and Western, which together accounted for less than 6% of placements.

Notably, 17.6% of participants reported either not yet deployed or serving outside designated neonatal facilities; suggesting potential challenges in aligning graduate placement with national neonatal service needs. The presence of one trainee currently based in the UK highlights emerging global mobility within Zambia's neonatal nursing workforce. Collectively, these findings highlight both the progress and uneven distribution of specialised neonatal nursing expertise across Zambia's health system. While the training programme has succeeded in producing a youthful and moderately experienced workforce; the data point to a continuing need for equitable deployment strategies to strengthen neonatal care coverage in underserved regions.

Faculty Intervention for Neonatal Nursing Programme at LUCON

For a standard class size of 40 Advanced Diploma students, the NMCZ recommends four clinical instructors and four tutors. According to the Zambia Paediatric Health Care Workforce Training Plan, the required level of education for a tutor is a BSc in Nursing (preferably Paediatrics related nursing) and an additional postgraduate training in neonatal nursing, while the requirement for clinical instructors is an Advanced Diploma, either as a clinical instructor or neonatal nurse. Based on these standards and the current training site availability, faculty gaps were assessed (Table 6), and corresponding interventions were highlighted. (Table 7).

Table 5: Distribution of Neonatal Nursing Trainees by Facility and Province

Province / Region	Representative Facilities	n	%
Lusaka Province	Women and Newborn Hospital, Levy Mwanawasa UTH, Kanyama, Matero, Maina Soko, CFB Medical Centre	14	20.6
Copperbelt Province	Ndola Central Hospital, Kitwe Teaching Hospital, Mpongwe (St. Theresa Mission), Luanshya, Chingola	8	11.8
Eastern Province	Chipata Central Hospital, Petauke District Hospital, Nyimba District Hospital	5	7.4
Southern Province	Monze Mission, Choma General, Macha Mission, Maamba General, Zimba Mission, Siavonga District Hospital	9	13.2
Central Province	Kabwe Central, Kapiri Mposhi, Mkushi, Mumbwa	6	8.8
Northern Province	Kasama General Hospital, Luwingu District Hospital, Isoka District Hospital	4	5.9
Muchinga Province	Chinsali District Hospital, Isoka District Hospital	2	2.9
Luapula Province	Mansa General Hospital, Mwansabombwe District	2	2.9
North-Western Province	Mwinilunga, Mufumbwe District Hospitals	3	4.4
Western Province	Kaoma Mother and Child Health, Kalomo District Hospital	2	2.9
Outside Zambia	United Kingdom (1 participant)	1	1.5
Not yet deployed / unknown	Not deployed or unspecified	12	17.6

Table 6: Faculty needs at LUCON for the Advanced Diploma Neonatal Nursing Programme (2020)

Paediatric Nursing Training Site	Faculty	Total available	Total with advanced diploma in neonatal nursing	Total with BSc in Nursing or Neonatal Nursing	Number of faculty with MSc in Child Health Nursing	Total number required for a class of 40	Gap in Faculty
Lusaka College of Nursing (LUCON)	Tutors/ lecturers	0	0	0	0	4 (BSc level)	4 (BSc level)
	Clinical Instructors	0	0	0	0	4 (advanced Diploma level)	4 (advanced Diploma level)

Table 7: Current status 2025

Paediatric Nursing Training Site	Faculty	Total Currently available	Total with advanced diploma in neonatal/Paediatric nursing	Total with BSc in Nursing or Neonatal Nursing	Number of faculty with MSc in Child Health Nursing	Number of faculty with MSc in Neonatal Nursing	Total number required for a class of 40	Gap in Faculty
Lusaka College of Nursing (LUCON)	Tutors/ lecturers	**4**	1	0	1	2	4 (BSc level)	Nil
	Clinical Instructors	1	0	0	0	0	4 (advanced Diploma level)	3 (advanced Diploma level)

Training Leadership and Governance

Previously, the neonatology training unit at LUCON faced staffing shortages, and the few neonatal nurse faculty were working in the Paediatrics Department led by a Paediatric and Child Health Specialist Nurse. This resulted in the neonatal nurses being given responsibilities that included overseeing paediatrics nursing students; a fact that had the potential of reducing the attention and priority given to neonatal nursing training. It may have also resulted in reducing the potential for neonatal nursing growth, as autonomy was not guaranteed. The bench marking conducted in Kenya showed that the neonatal nursing training unit at Kenyatta National Hospital is independent, resulting in more focus on neonatal nursing. Graduates are trained to provide clinical instruction to students, resulting in shared workload with the tutors. Currently, the neonatal training unit at LUCON is an independent entity. Training neonatal nurse clinical instructors and tutors would result in more focus on the growth of neonatal nursing.

The Neonatal Nursing training unit is actively looking for the former graduates to fill the clinical instructor positions once given the necessary training in clinical instruction. When it comes to skills laboratory requirements, LUCON received a donation of equipment and teaching aids from AMREF, which has significantly improved the quality of training. However, the College still faces challenges that include, limited space, insufficient equipment, and the absence of an independent simulation laboratory to enhance skill practice.

MSc in Neonatal Nursing at UNZA

To create a faculty that would drive neonatal nursing training in Zambia, UNZA, under the Strengthening Health Professions Workforce Programs (SHEPIZ) project, funded a curriculum development of the MSc in Neonatal Nursing, commencement of training and scholarship awards for a few outstanding students. The MSc in Neonatal Nursing is a two-year programme training neonatal nurses who are highly skilled nurses; and thus, work independently as part of a multidisciplinary team. The programme commenced in 2021 and attracted students from neighbouring countries of Malawi, Botswana, Tanzania, and Eswatini. The consistent participation of international students, particularly from Southern and Eastern Africa reflects a growing regional recognition of Zambia's advanced neonatal nursing education capacity. To date, a total of 34 students have enrolled in the programme (Table 8). Of these, 14 have graduated.

Table 8: Summary of achievements and Gaps for the Advanced Diploma Programme

	Achievements	Gaps
Numbers trained	85/120	35
Leadership and Governance	Neonatology training unit is independent resulting in undivided attention on neonatal nursing	
Teaching aids –skills lab	Some training aids donated by AMREF	Inadequately equipped skills lab No simulation equipment
Faculty /staffing	Adequate tutors to the number of students 1 qualified clinical instructor available	Deficit of 3 clinical instructors
Scope of Practice	Drafted	Awaiting final document
Program evaluation by Nursing and Midwifery Council of Zambia		Not done

The students are instructed by midwives, paediatric child nurse practitioners, neonatologists and neonatal nurse practitioners under COINN. Some lectures are delivered online with offsite faculty. The nursing students' online lectures are combined with MBchB PGDip on two out of three evenings a week. The clinical and bedside learning are conducted at the UTH Women and Newborn neonatal unit, with the MBchB PGDip graduates and trainees helping with acquisition of skills. The students spend four days of the week in the clinical area, mostly unsupervised.

Graduates from the programme are now distributed across academic, clinical, and district-level institutions,

including tertiary centres, such as the UTH and LUCON (Table 9). One student was retained by UNZA as a lecturer (currently enrolled in a PhD program to fulfil the lecturer criteria) and to work as a preceptor in the clinical area. Two former students work part time as tutors/ preceptors, despite having full-time jobs as lecturers at LUCON. These deployment patterns highlight the programme's dual contribution to clinical service delivery and educator capacity-building within the neonatal care domain. Additionally, ongoing cohorts signify the programme's institutional sustainability and its alignment with national health priorities to strengthen neonatal outcomes through specialized training.

Table 9: MSc in Neonatal Nursing Training Details by Year (2021–2025)

Year	Total Enrolled (n)	Nationality Distribution	Graduated (n)	Current Status / Station Distribution
2021	8	Zambia (8)	5	2 – Lusaka College of Nursing and Midwifery; 1 – University of Zambia; 1 – University Teaching Hospital; 1 – Chibombo District Hospital
2022	6	Zambia (5); Eswatini (1)	3	1 – Lusaka College of Nursing and Midwifery; 1 – Chingola School of Nursing; 1 – Eswatini
2023	7	Botswana (4); Malawi (1); Zambia (2)	6	4 – Botswana; 1 – Malawi; 1 – Kafue General Hospital
2024	5	Zambia (4); Malawi (1)	—	In training / awaiting results
2025	8	Zambia (3); Tanzania (2); Malawi (3)	—	In training / completed Year 1 examinations
Total	34	—	14 graduated	—

COINN in conjunction with the SHEPIZ project funded a Neonatal Nurse Practitioner (NNP) preceptor to assess the programme and work with the first cohort of students. The assessment showed that the training programme needed support in terms of faculty and preceptors in order to get properly established. The University is yet to create more permanent positions to employ the much-needed faculty to train more staff. Although the programme is accredited with NMCZ and approved by the Zambia Qualifications Authority (ZAQA), it still awaits finalisation of the scope of practice and long-term monitoring and evaluation framework to ensure programme effectiveness and quality assurance. Programme evaluation by students is very important tool in the training of student. Therefore Table 10 shows students' feedback on the course delivery, while Table 11 highlights a summary of the achievements and gaps for the MSc programmes.

Table 10: Student feedback on course delivery for the 2025 master's intake (N =8)

Theme / Domain	Illustrative Positive Comments	Recommendations for Improvement
1. Interprofessional Learning	"Blending nurses and doctors has been of great impact and easy to navigate through."	"Having a Bachelor's in Neonatal Nursing will help reduce workload on the master's program."
2. Mode of Delivery and Pedagogy	"The blended approach—both online and face-to-face—has great impact."	"The course should include more hands-on practice sessions immediately after theory classes."
3. Clinical Practice Exposure	"Working with doctors in the clinical area has improved our skills."	"Having a full-time instructor in the clinical area would be very helpful for hands-on teaching."
4. Curriculum Content	—	"There is a need to incorporate Quality Improvement as part of the Master's-level topics."
5. Clinical Environment Orientation	—	"Provide good orientation for NICU staff (nurses and doctors) to help students achieve objectives effectively."

Table 11: Summary of achievements and Gaps for the Masters' Programme

	Achievements	Gaps
Faculty	One graduate of the program has been retained to support preceptorship for the University	They have no PhD or DNP teaching MSc students which is the standard.
	One graduate works part time as a preceptor for the University	There's limited faculty to help with preceptorship of the trainees.
	The School of Nursing has applied to the University Senate for funding for new faculty positions	Awaiting feedback from the senate for employment positions
Scope of practice	Process of creating scope of practice commenced	There's no finalised scope of practice
Bachelors Neonatal Nursing	Curriculum done (Funded by AMREF)	Awaiting ratification by Nursing and Midwifery Council of Zambia
Employment of graduates	Ministry of Health Directorate of Nursing has been lobbying for funded positions from Ministry of Finance	Awaiting feedback from Ministry of Finance regarding funding for positions for neonatal nurses

Discussion

Commencing neonatal nursing training is a step towards improving the quality of care for the small and sick newborns. Although neonatal nursing training is picking up pace in Zambia, challenges are notable, and training is not yet at the planned level. This discussion highlights some of the notable areas of improvement to help training to scale.

Prioritisation

In some instances, candidates who wished to enrol in the programme have often been called back by their supervisors, citing that they were not on the health facility's training plan. This has compromised the number of candidates trained in each intake, especially those training at MSc level. Nevertheless, it is important to follow the MoH Policy, which states that before an employee is released to go for any type of training, they must appear on the hospital and provincial training plan.

Funding

Although both Diploma and MSc trainees are often government employees, they fund themselves to pursue their studies, due to limited financial support and lack of scholarships. However, students from other countries are usually funded by organisations, including their governments. Therefore, availability of scholarships would make it easier for more Zambian candidates to enrol into the training.

Post training employment/Placement

Training of employees is usually done with expectations of a salary upgrade and job satisfaction. Therefore, the unavailability of upgraded salaried employment post training makes the training less attractive. However, this is being addressed by the MoH, because the whole process involves creation of new positions, which is closely linked to availability of funds.

Clinical area and skills laboratory support

Both the Advanced Diploma and MSc students have their clinical attachment in the UTH NICU. However, due to inadequate equipment, the unit requires funding support for improvement of training facilities. Additionally, an upgrade of skills laboratory with high fidelity mannikin's is required for both training programmes.

Career Progression/Faculty development

MSc in Neonatal Nursing at UNZA is a two-years programme. However, due to limited number of faculty, most students take longer to complete, consequently slowing down development of the faculty. There is also limited faculty to help with preceptorship of trainees during clinical attachment. Thus, to accelerate faculty development, especially that the Bachelors' neonatal nursing curriculum has already been completed, there is need to discuss ways to speed up graduation of trainees. Currently, training has been relatively slow because entrants may not have previously worked in the neonatal unit, and hence, have limited knowledge, on the basics of neonatology. Therefore, the BSc programme is expected to make learning easier at Master's level, as most of the basics would have been covered at that level. Research shows that it takes a minimum of one year to move a novice neonatal nurse to being competent, even after didactic training[2]. For advanced practice it takes longer for a newly qualified graduates to be more than just competent to function; therefore, they undergo mentorship after graduating.

Creation of Position of Clinical Nurse Educator

Creating a position of Clinical Nurse Educator (CNE) to help with mentorship and teaching of students attached to the neonatal unit, especially in the absence of preceptors for both the Advanced Diploma and MSc training programmes would be a progressive move. To mitigate the lack of orientation, lack of consistency and too many

preceptors, a CNE has been placed in neonatal units in some countries. This cadre is an experienced mentor supported by the MoH, professional regulators and hospital administration, with clearly written guidelines and expectations, and a minimum qualification of a Bachelor's degree.

Having identified the gaps within the neonatal units in Zambia, the position of a CNE was explored and the MoH Permanent Secretary and Head of Nursing and Midwifery Department agreed with the creation of this position. The CNE will be a new role for the neonatal unit in Zambia, aimed at filling in the identified gap, by providing mentorship, practical clinical skills and conducting didactic sessions with nursing and medical students. The position holder would also be at hand to support the work of the nursing sister in charge by orienting the new members of the team.

CNEs are hospital and unit-based leaders who are passionate about teaching nurses who work within the unit, appropriate skills and knowledge needed to care for babies. Development of a CNE programme takes time and planning (12). Seed Global Health, Zambia working with the Midwives Association of Zambia (MAZ) identified midwives that were interested in teaching; trained them on how to teach and placed them in the district hospital, labour ward to work as preceptors/Nurse Educators.

Conclusion

Neonatal nurses are cardinal to the survival of small and sick newborns. The paucity of training programmes in most parts of Africa poses a challenge to improving neonatal care. Concerted efforts from paediatricians, neonatologists and nursing faculty are vital to creating programmes that support creation of faculty for future and sustainable training. Government investment is essential to achieve this, and MoH should be engaged for support. The training programmes in Zambia continue to improve but still need support to train neonatal nurses to scale.

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Authors Contribution

Dr. Kunda Mutesu-Kapembwa: Conceived the idea and prepared the manuscript
Ms. Monde Muyangana: Reviewed the manuscript and made significant contribution to the content
Ms. Chali Josephine: Reviewed the manuscript and made significant contribution to the content
Dr. Concepta N. Kwaleyela: Reviewed the manuscript, made significant contribution to the content and made detailed edits
Dr. Maureen Masumo: Reviewed the manuscript and made significant contribution to the content
Dr. Sue Prullage: Reviewed the manuscript and highlighted the significant components of the guide
Mr. Rodgers Gift Benkele: Reviewed the manuscript and made significant contribution to the content of the guide

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