Full Length Research Paper

Using a task analysis to strengthen nursing and midwifery pre-service education in Malawi

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The Nurses and Midwives Council of Malawi (NMCM) has engaged in significant efforts to reform nursing and midwifery pre-service education in Malawi. To that end NMCM decided to revise and strengthen existing syllabi and curricula for nurse midwifery cadres, starting with the nurse midwife technician (NMT). In an attempt to make evidence-based decisions for syllabus revision, NMCM conducted a task analysis to assess how prepared nurse midwife technicians (NMTs) were to perform tasks in their daily jobs. NMCM used the activity to identify curricular gaps and key NMT tasks. In the task analysis, quantitative and qualitative methods identified NMTs' perceptions of tasks required for daily practice, competency to perform such tasks, factors influencing quality of care, and pre-service programmatic gaps. NMCM collected data from 48 NMTs randomly selected from a weighted sample of NMTs from all districts. The most frequently performed tasks (≥ 50%) were found to be in infectious diseases and midwifery. NMTs felt inadequately prepared to handle human immunodeficiency virus (HIV) cases, obstetric complications, and certain family planning methods. Findings also identified gaps in clinical training and faculty supervision. The task analysis provided a robust approach to curriculum revision through identifying key content gaps and soliciting expert clinical input. Other countries should consider adopting this approach to improving the content and relevancy of nursing and midwifery syllabi and curricula.

Key words: Task analysis, curriculum revision, nursing and midwifery education.

INTRODUCTION

The Malawi Health Sector Strategic Plan 2011 to 2016 (HSSP) delineates the priority health conditions that affect the country's population. Human immunodeficiency virus (HIV), tuberculosis (TB), malaria, and maternal and child health conditions feature prominently in the HSSP as significant drivers of morbidity and mortality (Ministry of Health, Government of Malawi [MoH], 2011a). Despite major strides towards achieving country-specific Millennium Development Goals (MDGs), more work needs to be done to fully achieve health targets (Ministry

of Development, Planning, and Cooperation, 2010; Commonwealth Foundation, 2013). In key clinical areas, such as HIV and maternal and child health (MCH), the Government of Malawi uses task shifting from higher level cadres to nurse midwives and other health cadres to fill critical gaps in health service delivery and meet population health needs. In alignment with the World Health Organization (WHO) and the U.S. President's Emergency Plan for AIDS Relief's (PEPFAR's) Nursing and Education Partnership Initiative, the Nurses and Midwives Council of Malawi (NMCM) and the MoH Nursing Directorate have initiated widespread educational reform in Malawi to ensure that nursing colleges produce highly competent graduates who are able to meet the population's health demands. Development of evidence-based curricula that are linked to national disease priorities is a critical intervention for maintaining high-quality pre-service educational programmes for nurses and other health cadres (Frenk et al., 2010).

To that end, NMCM has mandated timely revision of prescribed pre-service syllabi and curricula for nursing and midwifery cadres. Three levels of nurse midwifery cadres currently exist in Malawi: B.Sc, RN Diploma, and nurse midwife technicians (NMTs). NMTs have three years of general nursing and midwifery training, and graduate with a diploma. NMCM prioritized syllabus and curriculum revision for this cadre as NMTs exhibited poor performance on national licensure examinations and practice from 2008 to 2010. NMCM wanted to investigate areas of the current syllabus where the NMT cadre might fall short of meeting patients' health needs.

NMCM's approach to syllabus revision for nursing and midwifery programmes has historically relied on expert consultation in a workshop-type setting. The International Training and Education Center for Health (I-TECH) introduced the novel approach of using a task analysis to develop an evidence-based pathway for syllabus revision in Malawi. In 2011, I-TECH partnered with NMCM to conduct a task analysis of the NMT cadre. This article presents the methodology that was used to conduct the NMT task analysis and discusses how the results of the task analysis were practically applied to strengthen nursing and midwifery pre-service education.

Using task analyses for syllabus and curriculum revision

A task analysis, at times referred to as a job analysis, can be used for a variety of purposes within the nursing and midwifery context, including developing requirements for certification, developing or revising curricula, determining the amount of time spent on job activities, evaluating patient care, developing accurate job descriptions, and determining staffing requirements or in-service continuing education needs (Moore, 1985, 1999; Udaya et al., 2011). Various methods are employed to conduct a task analysis, including conducting interviews, obtaining input from a cross-section of experts, administering a task questionnaire, and using direct observation to provide additional information about tasks (Moore, 1985). Task analyses have been conducted among specialized nursing groups in the United States to help inform professional education (e.g., developing curricula), to strengthen regulatory activities (e.g., defining scope of practice and improving national certification examinations), and to improve practice (e.g., improving work environments) (Battisto et al., 2009; Fabrey and Walla, 2004; Fullerton, 1988, 1994).

There is little documented literature regarding the use of task analyses to help strengthen nursing and midwifery pre-service educational programmes in resource-limited settings. The international non-profit health organization Jhpiego conducted a task analysis for nursing cadres in Liberia to provide a platform for nursing education and health policy reform. The results identified the need to strengthen specific technical content in the curriculum (Udaya, 2011). Uys et al. (2003) conducted a series of job analyses in a district health system in South Africa to examine nurses working in hospitals and primary care settings. The results were used to help inform scope-of-practice differentiation among nursing cadres (Mbambo et al., 2003; Uys et al., 2003). A small number of additional unpublished task analyses have been conducted in the sub-Saharan region by international partners, such as by Jhpiego for nursing cadres and by I-TECH for a mid-level health care cadre in Mozambique. I-TECH Mozambique's rapid task analysis revealed discrepancies between the curriculum and the scope of practice for the cadre, identified clinical areas within the curriculum that needed content to be strengthened, and helped provide a foundation for competency revision (unpublished report by the Ministerio de Saude, Mozambique and I-TECH Mozambique, 2008).

The primary goal of the NMT task analysis in Malawi was to provide the empirical evidence needed to revise the 2009 NMT syllabus (NMCM, 2009) and to create a dynamic and responsive NMT training programme that prepares NMTs to meet the health needs of the population. The task analysis questions were designed to assess NMTs' perceptions of the tasks required for daily practice, their competency to perform tasks, and their place of learning (college pre-service programme versus on-the-job training). An additional objective was to identify pre-service programmatic gaps, for example in the syllabus, curriculum, and clinical training, and the factors that influence the quality of NMT delivery of care. NMCM convened a national task force comprising nursing and midwifery clinical experts and additional key nursing educational stakeholders and policy makers who would be given the specific task of revising the NMT

syllabus once the task analysis results were available.

METHODOLOGY

Design

The NMT task analysis used a concurrent mixed-methods design that expanded on the methodological approaches employed by Jhpiego and I-TECH Mozambique during previous task analyses. The University of Washington Human Subjects Division issued a non-research determination for all activities related to this project. Additionally, the National Health Sciences Research Committee at the Ministry of Health in Malawi provided approval to publish the findings of this task analysis.

Sampling

With the aim to obtain a nationally representative sample of NMTs. NMTs from each of the 28 districts in Malawi were invited to participate in one of two task analysis workshops (held in Lilongwe and Blantyre for three days each and included both quantitative and qualitative methods for data collection). These NMTs were selected from a list of currently registered NMTs that was available from NMCM's national database. This list was used first to generate a weighted sample of NMTs that accounted for variance in population size of each district and thus the number of NMTs in the district. This weighted sample was then used to randomly select NMTs from each district. If a selected NMT was not available to participate, another NMT in the district was randomly selected to participate. Sampling criteria restricted participating NMTs to those who were registered with NMCM between 2005 and 2009, were known to be alive, and had active licensure. Invitation letters were sent to District Health Officers to obtain appropriate approvals for selected personnel to participate in the activity.

For logistical ease, the NMTs sampled from the Northern/Central regions were assigned to attend a workshop in Lilongwe (28 participants), and the NMTs from the south were assigned to attend a workshop in Blantyre (28 participants). Five of the 28 participants from the Lilongwe workshop were subsequently discovered to be RNs, thereby failing to meet inclusion criteria. An additional three participants were discovered to have graduated prior to 2005. Data from these eight participants were removed from the final analysis even though these participants remained in the workshops.

Quantitative methods

A participant profile survey and a task analysis questionnaire were used for each workshop. The participant profile survey covered demographics, educational training information, and general workplace information such as facility type. The task analysis questionnaire was administered to determine the frequency with which NMTs performed tasks (never/not applicable, rarely, monthly, daily/ weekly), NMTs' self-rating of competency for each task (do not perform/not applicable, feel uncomfortable performing/need training, competent but would like more training, skilled/able to train others), and where the NMTs learned how to perform each task (never learned/not applicable, nursing college, in-service training, on the job) (Appendix).

The task analysis questionnaire repeated these same three questions for each of 201 clinical tasks across 10 clinical categories (Table 1; for list of categories). The questions used for each task were built upon the methods employed in Jhpiego's task analysis in Liberia (Udaya et al., 2011). The 10 categories were based on

priority health conditions listed in Malawi's HSSP, and the tasks were generated based on a review of nursing and midwifery competencies collected from various sources, including the International Confederation of Midwives and the International Council of Nurses. Both data collection tools were piloted with a convenience sample of six NMTs from Kamuzu Central Hospital prior to the workshops to check clarity of wording and if the right tasks were being used. The tools were then adjusted accordingly.

Qualitative methods

A group course ranking exercise and focus group discussions (FGDs) were included at each workshop. The course ranking exercise allowed participants to rank the importance of college courses from the 2009 NMT syllabus in terms of preparation for work. Seven FGDs were held with participants in order to obtain in-depth information about their pre-service education and subsequent professional work experience. FGDs included questions on NMTs' perceptions of the suitability and application of their pre-service education to their work environment and job duties. Participants also discussed the level of task shifting occurring and the health systems issues that most affected the quality of care they provided.

Data collection

During the two workshops, an eight-person facilitation team consisting of I-TECH staff and NMCM-appointed consultants from the Kamuzu College of Nursing collected data from the 48 eligible participants. For quantitative data collection, NMTs completed participant profile surveys (48 in total) at the start of their workshop. The task analysis questionnaire (48 in total) was administered through a facilitated process to ensure that participants completed the entire set of questions. Facilitators verbally guided NMTs to work through each section of questions and provided energizers as needed when participants showed visible signs of fatigue. To improve data collection efficiency, the team administered the questionnaire via Scantron technology, a method widely used for student examinations and surveys in the U.S. Scantron allows for rapid scanning of large amounts of data for data analysis purposes. For example, data from 48 questionnaires were scanned in less than 10 min. Participants were trained on the use of Scantron methods before they completed the questionnaire. Data were uploaded to a Microsoft Excel file for preliminary analysis, using frequencies. On day three of each workshop, preliminary results from the questionnaire were shared with participants and a select group of nursing stakeholders (invited for the results session only).

For qualitative data collection, on day 2 of the workshops FGDs were each conducted by one moderator and one note taker using a pre-established, semi-structured interview guide. Participants were randomized into a total of seven focus groups (each including between seven to eight NMT participants). All FGDs were carried out in English. Slightly over a quarter (26.9%) of FGD participants were male. Five different facilitators were used in total. Two course ranking exercises were conducted: one in Lilongwe and another in Blantyre (modified based on input from the Lilongwe workshop). Participant responses were recorded on flip chart paper and later compiled for analysis. Oral and written consents were obtained from each focus group participant. Consent forms were stored in locked cabinets in Lilongwe, and electronic files from the audiotapes were stored on password-protected computers in Seattle.

Data analysis

Quantitative survey and questionnaire data from the 48 eligible

Table 1. Ten clinical categories used for the task analysis questionnaire.

1	Midwifery: Antenatal care, normal labour and early postpartum care, newborn care, post-partum care, obstetric complications, family planning
2	Infectious diseases: HIV, TB, malaria, acute respiratory infections, diarrhoeal diseases, neglected tropical diseases, eye, ear, and skin infections
3	Vaccine-preventable diseases
4	Malnutrition
5	Cancer
6	Non-communicable diseases: Overweight/obesity, diabetes, cardiovascular disease/hypertension, asthma, hearing loss
7	Trauma and emergency care
8	Clinic systems
9	Mental health
10	Community health
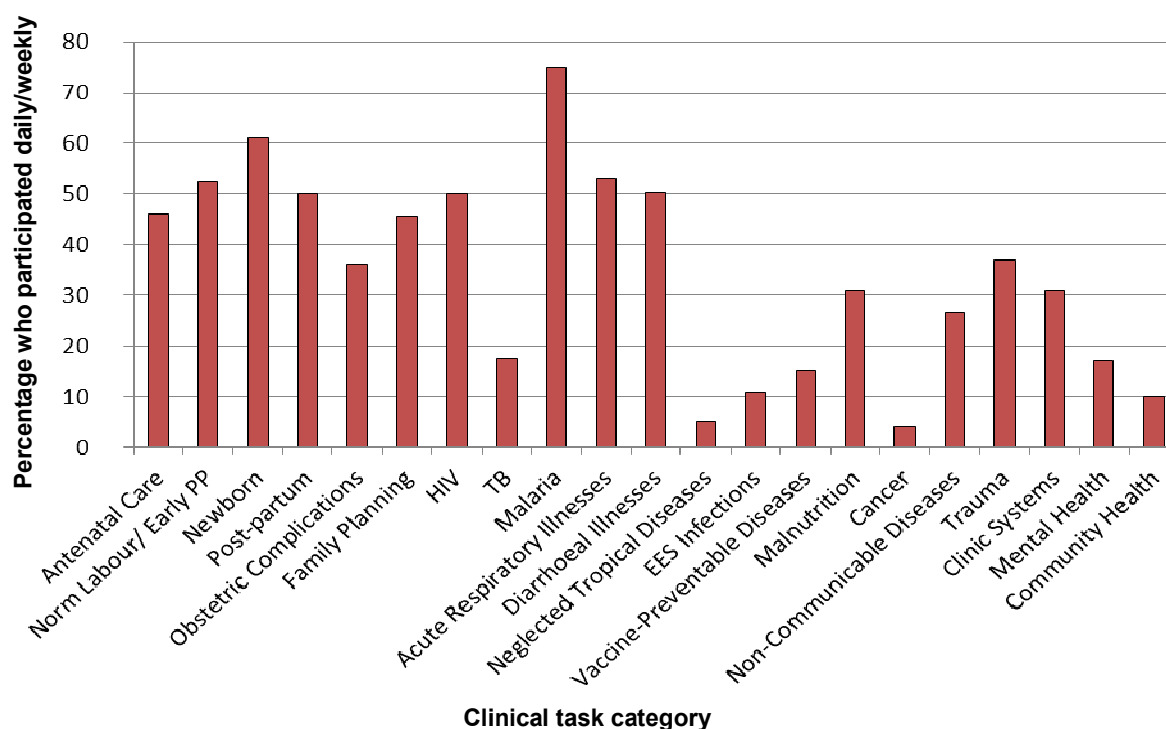
Figure 1. Mean percentages of participants who practiced tasks on daily or weekly basis (by clinical task category).

participants were analyzed using simple descriptive statistical measures with Stata 11 statistical software (StataCorp 2009). Proportions and percentages were calculated for participant responses to each of the three questions tied to the 201 tasks. The mean percentages of the number of participants reporting daily/weekly task frequency, feeling competent or skilled in the task, and learning a task in college were then calculated for all tasks per clinical category (Figures 1 to 3). These means helped to illustrate key trends across clinical categories, some of which pointed to potential content gaps in the 2009 version of the NMT syllabus. For

example, on average, 20% of participants reported feeling competent performing neglected tropical diseases (NTD) tasks, while 90% of participants reported feeling competent performing malaria tasks. To help further identify trends that provide additional information about training gaps, cross-tabulations of frequencies were performed for multiple comparisons, including for tasks performed daily or weekly by more than 60% of NMTs, by competency level, and by where tasks were learned. Data from the course ranking exercises were analyzed using simple summary measures.
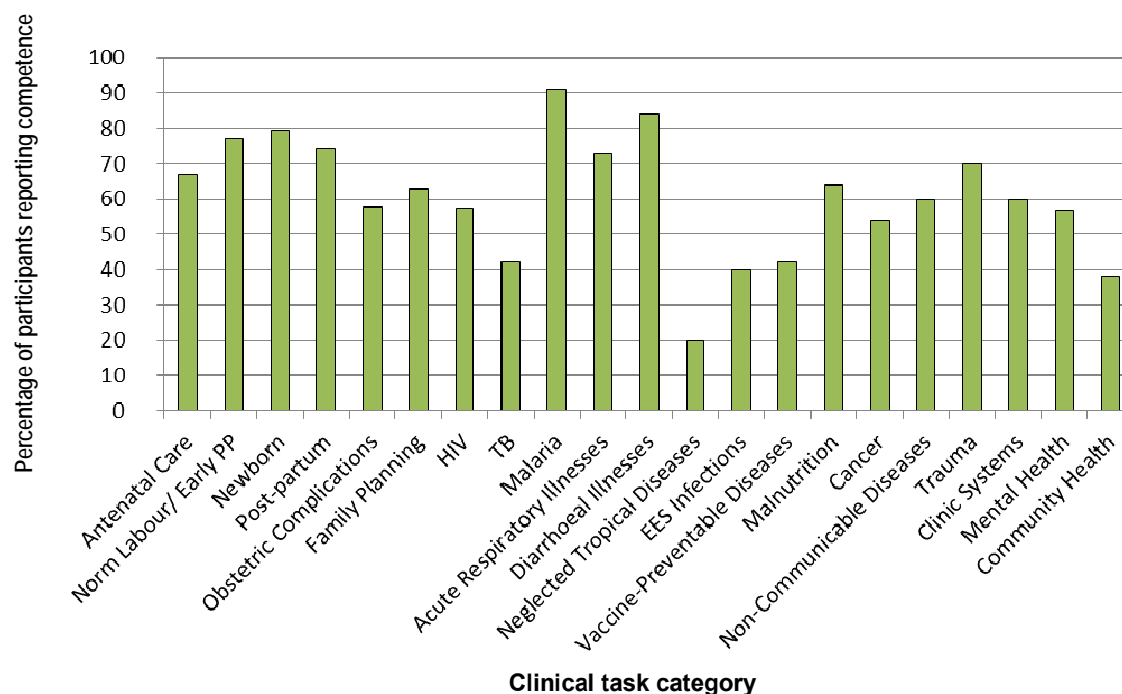
Figure 2. Mean percentages of participants who felt competent performing tasks (per clinical task category).
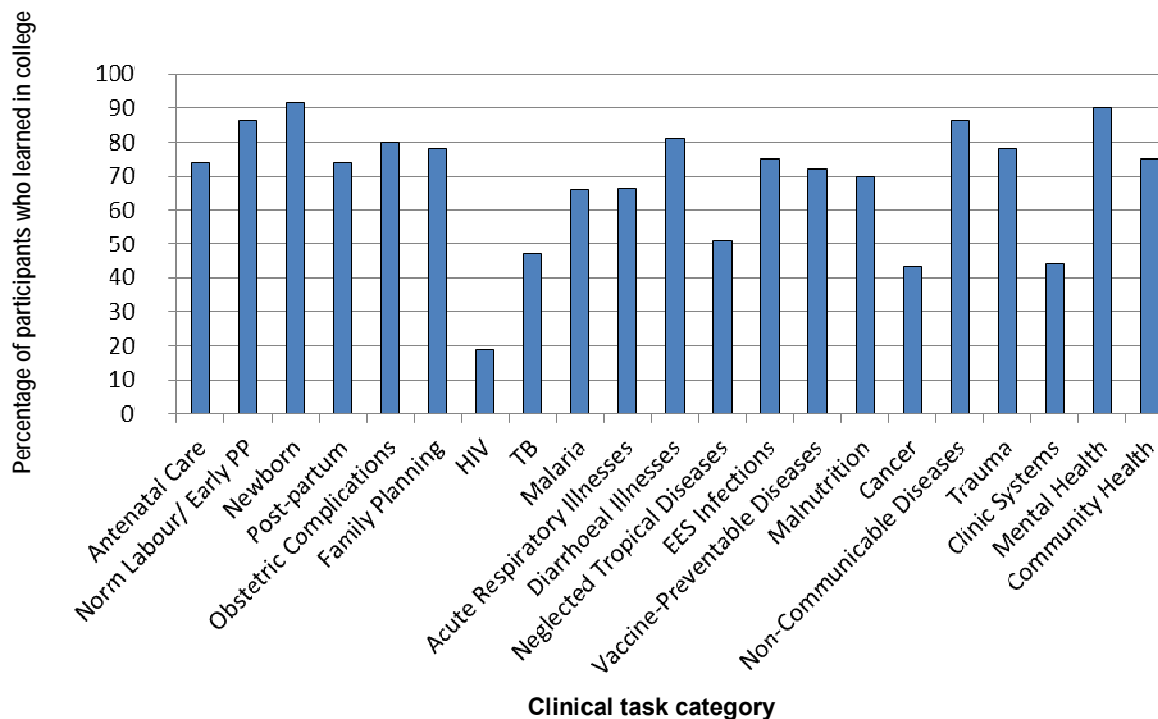

Figure 3. Mean percentages of participants who learned tasks in college (per clinical task category).

Qualitative FGDs were audiotaped with permission from participants and were transcribed verbatim. This resulted in nearly 300 pages of transcripts for coding and summarizing. Two transcripts required a small amount of translation from Chichewa to

English. The translation was done in Malawi. Prior to analysis, each transcript was reviewed and cleaned by I-TECH staff familiar with the Malawian nursing context. All transcripts were then analyzed by two coders using ATLAS.ti (version 6) through an iterative process, using both a priori and inductive coding (ATLAS.ti 2011). Both coders compared coding results and came to consensus regarding final codes. One of the coders was a former NMT tutor in Malawi and was able to contextualize the analysis.

To further explore areas in the syllabus requiring strengthened content, the team performed a detailed desk review of the 2009 NMT syllabus and compared findings against the priority health conditions identified in the MoH's HSSP. The team then mapped out and linked participant responses to questions specific to clinical tasks in the questionnaire to matching content in the syllabus, to further illustrate training gaps. For example, the review of the 2009 NMT syllabus revealed that there was insufficient NTD content included in the syllabus, even though NTDs are considered a priority health area according to the HSSP. Participant responses regarding NTD tasks revealed that low numbers of NMTs reported feeling competent with NTD tasks. The pairing of this information (insufficient content about NTDs in the syllabus with task analysis findings about competency level for this clinical area) helped identify NTDs as an area that would require attention during the syllabus revision process.

Once all the quantitative and qualitative data were analyzed separately, the team was faced with the task of merging the results of task frequency, competency levels, and learning of tasks during college versus on the job with the FGD results. The examination of the data through qualitative and quantitative lenses in some instances very clearly pointed to gaps in content. For example, in managing obstetrical complications, results from the questionnaire and FGD were in direct agreement. This resulted in clear recommendations for the Task Force. At times, qualitative results were the opposite of participants' responses to the questionnaire, and this resulted in challenges in formulating recommendations. For example, the HIV qualitative results revealed that participants did not feel skilled in certain aspects of HIV clinical management, while the questionnaire results showed that the majority of participants felt competent with HIV tasks. In these cases, the team made recommendations for the task force to proceed with addressing areas of articulated need, despite discordant results.

RESULTS

Description of participants

The majority of the 48 participants were females (73%), graduates of the 2008 NMT cohort (75%), and were graduates from Christian Health Association of Malawi (CHAM) nursing colleges (87%). The participants' affiliated clinic work facilities were almost equally divided between the northern/central (46%) and southern (54%) regions. Participants represented 20 out of 28 districts in the country. Majority of the participants (65%) worked at either secondary- or tertiary-level hospital facilities. About 60% reported that their work focus was completely clinical (with no administrative duties). Out of the 37 participants who reported a specialty, 60% worked in either general or maternity-related (midwifery) settings. The participants who did not report a specialty worked in health centres (Table 2; for a summary of participant

characteristics).

Overall trends

Figures 1 to 3 summarize the aggregate participant responses for the three main questions asked about tasks across each clinical category in the task analysis questionnaire. In general, participants seemed to frequently perform, feel competent with, and learn tasks in college most commonly for tasks within the midwifery and infectious diseases categories. This suggests that these two content areas were covered well during NMT pre-service programmes. Results showed that the clinical tasks performed most frequently (by 50% or higher of participants) were in all areas of midwifery (except ANC and obstetric complications) and infectious diseases (except TB, NTDs, and EES infections) categories (Figure 1). Majority of the participants (60% or more) reported feeling competent in tasks for malaria, acute respiratory infections (ARIs), diarrhoeal diseases, malnutrition, non-communicable diseases, trauma, and clinic systems, and in all of the midwifery tasks (except for obstetric complications) (Figure 2). The tasks most commonly learned in college (for 70% or more of participants) were all of the midwifery tasks. The task category least frequently learned in college was HIV (<20% of participants) (Figure 3).

Findings from the review of the 2009 NMT syllabus revealed content gaps in several key HSSP priority health areas. The syllabus (NMCM, 2009) had either scant or no competencies listed for many infectious as well as non-communicable diseases, including HIV, TB, malaria, and neglected tropical diseases. Broad concepts, such as "management of patients with disorders of the cardiovascular system", were included in the syllabus. However, the syllabus then failed to mention detailed content regarding non-communicable diseases such as hypertension and diabetes. Content in other priority HSSP areas, such as midwifery, community health, and mental health, was covered in much greater detail across several courses in the syllabus.

Infectious diseases

For 16 out of 29 HIV tasks, 50% of participants reported engaging in the task on either a daily or weekly basis (individual tasks ranged from 40 to 58%). Across all tasks in the HIV category, majority of the participants (57.39%) reported feeling either skilled or competent (individual task range, 42 to 77%) (Table 3). Across all HIV tasks, on average only 19% of participants reported learning HIV tasks in college (individual task range from 8 to 38%). For 25 out of 29 HIV tasks, majority of the participants reported learning the tasks outside of their pre-service

Table 2. Participant characteristics.

Participant findings	N (%)
Gender	
Female	35 (72.9)
Male	13 (27.1)
Total	48 (100.0)
Year of graduation	
2005	2 (4.2)
2006	2 (4.2)
2007	6 (12.5)
2008	36 (75.0)
2009	2 (4.2)
Total	48 (100.1)
Work facility location (by district)	
Zomba	9 (18.8)
Lilongwe	4 (8.3)
Blantyre	4 (8.3)
Dedza	4 (8.3)
Mangochi	3 (6.3)
Chitipa	3 (6.3)
Chiradzulu	2 (4.2)
Karonga	2 (4.2)
Mzimba	2 (4.2)
Nkhata Bay	2 (4.2)
Phalombe	2 (4.2)
Salima	2 (4.2)
Thyolo	2 (4.2)
Balaka	1 (2.1)
Dowa	1 (2.1)
Machinga	1 (2.1)
Mulanje	1 (2.1)
Mzuzu	1 (2.1)
Neno	1 (2.1)
Nkhotakota	1 (2.1)
Total	48 (100.0)
Location of work facility	
Northern/Central regions	22 (45.8)
Southern region	26 (54.2)
Total	48 (100.0)
Ward allocation	
General (Female/Male/Male REHAB/OPD)	12 (32.4)
Maternity-related (Labour/MCH/Maternity/Post-natal)	10 (27.0)
Paediatric	7 (18.9)
Surgical/Theatre/ICU	5 (13.5)
Infectious diseases (ART and STI/TB/TB and ART)	3 (8.1)
Total	37 (100.0)
Work focus	

Table 2. Cont'd.

100% clinical	29 (60.4)
50% admin, 50% clinical	12 (25.0)
10% admin, 90% clinical	3 (6.2)
20% admin, 80% clinical	2 (4.2)
30% admin, 70% clinical	2 (4.2)
Total	48 (100.0)
Number of in-service trainings attended since 2009	
None	3 (6.7)
1–3	12 (26.7)
4–6	14 (31.1)
7 or more	16 (35.6)
Total	45 (100.1)
Facility type	
Secondary hospital	20 (41.7)
Tertiary hospital	11 (22.9)
Rural health centre	10 (20.8)
Urban health centre	6 (12.5)
Primary-level hospital	1 (2.1)
Total	48 (100.0)
Type of training institution	
Government sector	6 (12.5)
CHAM	42 (87.5)
Total	48 (100.0)
Location of training institution	
Northern/Central regions	13 (27.1)
Southern region	35 (72.9)
Total	48 (100.0)

Percentages are rounded to the nearest tenth; some totals exceed 100 due to rounding.
OPD: Outpatient department; MCH: maternal and child health; ICU: intensive care unit;
ART: anti-retroviral therapy; STI: sexually transmitted infection; CHAM: Christian Health
Association of Malawi.

programme, either in in-service trainings (51.0%) or on the job (10.7%) (Table 3). This could indicate a possible gap in HIV content in the 2009 NMT syllabus.

Despite questionnaire responses indicating that majority of the participants felt skilled or competent with HIV tasks, qualitative findings indicated that participants in all focus groups felt unprepared to provide up-to-date management of HIV in accordance with the recent MoH antiretroviral therapy (ART) and prevention of mother-to-child transmission (PMTCT) Option B+ guidelines (MoH, 2011a). One NMT noted the following about PMTCT content:

"I'd wish if our curriculum in the colleges could tackle the issue of PMTCT in the sense that when one is graduating [one should be] able to counsel the patient, test and administer drugs appropriately; so that the moment you

are graduated you become competent".

Participants in three FGDs specifically noted that coverage of HIV was superficial during NMT training (and this was also supported by task analysis questionnaire findings). Another participant noted that "because in Malawi most people are infected now, since the regimen is dynamic, one need(s) a wider knowledge on HIV-related conditions and should go deeper". Participants in all the groups mentioned that the new regimens were not available when they were in school. One participant, while talking about challenges of accessing in-service trainings, noted:

"These topics [covered during in-service trainings] have been there in colleges. We have already learned HIV/AIDS-related diseases; [but] we do not go much into

Table 3. HIV tasks and participant reports of performance frequency and competency level.

Task	% of participants who practice task daily or weekly (*n*/*N*)	% of participants who feel skilled/competent with task (*n*/*N*)	% of participants who learned task in college (*n*/*N*)
HIV1: Provide HIV-screening to children under 24 months who are born to HIV-positive mothers	48 (23/48)	67 (32/48)	23 (11/48)
HIV2: Counsel parents on approaches for disclosing HIV status to paediatric patients	27 (13/48)	44 (21/48)	17 (8/48)
HIV3: Support newly diagnosed HIV patients to cope with psychosocial and emotional pressures	50 (24/48)	69 (33/48)	21 (10/48)
HIV4: Facilitate timely enrollment of exposed infants (including those breastfeeding from HIV-infected mothers into HIV care)	52 (25/48)	65 (31/48)	17 (8/48)
HIV5: Determine eligibility of HIV patients for ART according to CD4 counts and clinical staging	50 (24/48)	65 (31/48)	19 (9/48)
IV6: Provide CPT to HIV patients	58 (28/48)	69 (33/48)	23 (11/48)
IV7: Routinely screen HIV patients for active TB	40 (19/48)	63 (30/48)	19 (9/48)
IV8: Provide counseling on infant and child feeding to HIV-positive mothers	54 (26/48)	42 (33/48)	38 (18/48)
IV9: Provide adherence counseling to HIV patients.	54 (26/48)	75 (36/48)	25 (12/48)
IV10: Prescribe and dispense ART for HIV-positive mothers	48 (23/48)	58 (22/48)	13 (6/48)
IV11: Prescribe and dispense ART for paediatric patients	40 (19/48)	56 (27/48)	8 (4/48)
IV12: Provide PEP for eligible patients with risky exposures in the last 72 h	25 (12/48)	60 (29/48)	21 (10/48)
IV13: Identify and monitor HIV-related diseases such as oral candidiasis, chronic diarrhoea, TB, shingles (herpes zoster) using the standard clinical monitoring checklist for HIV patients	54 (26/48)	67 (32/48)	21 (10/48)
HIV14: Screen for ART medication side effects using the standard clinical monitoring checklist	52 (25/48)	56 (27/48)	17 (8/48)
HIV15: Treat HIV-related diseases such as oral candidiasis, chronic diarrhoea, TB, and shingles (herpes zoster)	46 (22/48)	69 (33/48)	29 (14/48)
HIV16: Provide counseling for family planning (e.g., condoms and Depo-Provera) to HIV patients	52 (25/48)	77 (37/48)	33 (16/48)
HIV17: Provide counseling on s interventions (e.g., ART adherence, recognizing symptoms of STIs) to HIV-positive patients	52 (25/48)	69 (33/48)	21 (10/48)
HIV18: Link HIV-positive patients to appropriate community programmes and local resources	40 (19/48)	56 (27/48)	8 (4/48)
HIV19: Identify and diagnose cases of HIV treatment failure	23 (11/48)	46 (22/48)	17 (8/48)
HIV20: Compile monthly facility HIV reports for ANC, maternity, and exposed-child follow-up visits	6 (3/48)	44 (21/48)	10 (5/48)

CPT: Cotrimoxazole prophylaxis; ART: anti-retroviral therapy; PEP: post-exposure prophylaxis; PWP: prevention with positives; ANC: antenatal care.

details. Now this is the disease which is common and when a complication comes we fail to manage it."

One participant noted that there is a training gap regarding HIV:

"when we are in school, they do not stress much on that (referring to ART regimens)".

Participants in six FGDs specifically mentioned the need for more counseling skills for the HIV testing and counseling process in the curriculum. Participants in two FGDs wanted to add or increase coverage of HIV-related diseases and opportunistic infections, WHO staging of HIV, and

paediatric HIV content. Others suggested that the curriculum needed to be more current, with updates in HIV and other clinical content.

A small percentage of participants, an average of 17.4%, reported performing TB tasks on a daily or weekly basis (range from 2 to 44% for all tasks in the category). The percentage of participants who felt competent with TB tasks (42%) and had

Table 4. Midwifery tasks with low levels of reported competency.

Task	% of Participants who feel skilled or competent (*n*/*N*)
ANC9: Provide treatment (or refer to next level of health facility, if indicated) for PID during pregnancy	40 (19/48)
OC3: Initiate labour augmentation using oxytocin for prolonged labour	35 (17/48)
OC5: Perform vacuum extraction deliveries	21 (10/48)
OC14: Manage shoulder dystocia	25 (12/48)
FP4: Insert contraceptive rods	31 (15/48)
FP5: Insert IUDs	8 (4/48)

ANC: Antenatal care; OC: obstetric complications; FP: family planning; PID: pelvic inflammatory disease; IUD: intrauterine device.

learned TB tasks in college (47%) was also low. During the review of the 2009 NMT syllabus, no TB-specific competencies or content were identified. This points to a gap within the actual syllabus from a TB content perspective (Results not included in this manuscript).

An apparent gap in malaria content was also noted in the 2009 NMT syllabus, since malaria was not specifically mentioned as part of required competencies or in the content. However, on average majority of the participants reported learning malaria tasks in college (66%), noted that they were performing malaria-specific tasks on a daily/weekly basis (75%), and felt competent with the malaria tasks included in the questionnaire (91%). The categories of ARIs and diarrhoeal diseases followed similar trends for tasks learned in college, perceived competency, and frequency of tasks performed. As with malaria, related competencies were missing from the 2009 NMT syllabus; however, participant responses indicated that relevant content was being taught during NMT pre-service educational programmes (Results not included in this manuscript).

For certain disease categories such as eye, ear, and skin (EES) infections, vaccine-preventable diseases, and community health, NMTs on average performed tasks infrequently and did not feel competent with tasks, despite a majority of participants learning about these tasks in college. In the categories of neglected tropical diseases and cancer, participants on average performed tasks infrequently, tended to not feel competent with tasks, and did not learn tasks in college. In the malnutrition, non-communicable diseases, trauma and emergency care, and mental health categories, participants performed tasks infrequently, but the majority felt competent with tasks and had learned tasks in college. For the clinic systems category, NMTs performed tasks infrequently and tended not to have learned tasks in college, but majority reported feeling competent with the tasks (Results not included in this manuscript).

Midwifery

In general, participants felt competent with the midwifery

tasks they perform and had learned how to do these tasks during their nursing pre-service programmes. Of all tasks in all clinical categories that were performed on a daily or weekly basis by more than 60% of the NMTs, participants more frequently reported feeling confident or skilled with tasks in the midwifery category. Participant responses indicated low levels of competency for only 6 out of 62 midwifery tasks. These 6 tasks included obstetric complications and family planning tasks (Table 4), and tended to be tasks that were performed infrequently at their sites. For example, 6% of participants reported performing vacuum extractions on a daily or weekly basis, and only 21% of participants reported feeling competent with performing vacuum extractions.

Qualitative findings corroborated the quantitative results about obstetric complications and family planning. When participants were asked to identify tasks, they felt they were not well prepared to perform, and correspondingly, which topics should be added to or expanded in the NMT curriculum, they identified midwifery, and specifically obstetric complications. One NMT responded:

"I think it needs much on time midwifery, especially high-risk. People are not competent enough to give nursing care. For example, if you can investigate, a lot of people they do not know how to conduct breech delivery, (pause) and most of the times the outcomes are not too good".

When queried about specifics regarding gaps in midwifery content, participants in five out of seven FGDs felt unprepared to conduct a manual vacuum extraction to complete an incomplete abortion. One participant noted:

"In the colleges, there may be more of this [content on] manual vacuum extraction, instruction of manual removal of placenta, but we did not do it regularly. But in the field, we are supposed to do it. So my plea is to the colleges to teach them to teach their students, both theory and practical. So they should not find problems when they go to the field".

Participants recommended more teaching time for obstetric complications, such as shoulder dystocia and newborn resuscitation, a smaller student/patient ratio at clinical sites, and student clinical attachments in facilities that are more likely to have complicated midwifery cases. With regard to reproductive health, participants in four FGDs discussed the need for more training and practice in long-term family planning, including contraceptive implants (discussed in three FGDs) and intrauterine device (IUD) insertion and removal (discussed in two FGDs).

NMT training programme considerations

During FGDs, participants emphasized that the NMT programme should continue to train students on both general nursing and midwifery content to ensure that they are fully prepared to care for a diverse set of patients upon graduation. One participant explained:

"It is good to have nursing and midwifery together because you do not fear to work at a certain place because you know that you know everything; in most of the health centers, you do not only take care of medical conditions only or maybe for a part, but we take both of them, so it is very important to have both [nursing and midwifery training]".

NMTs also noted that such broad training helps make them more flexible to rotate to new posts as needed.
   Participants did not have specific recommendations for where content could be removed or limited in the current syllabus. Rather, because of the need to be as prepared as possible for clinical care, some NMTs were reluctant to consider eliminating any topics that they might encounter in current or future postings. Participants also emphasized a desire for the syllabus to be evidence-based, with up-to-date clinical research findings. All FGDs voiced a need for more clinical practicum training with an emphasis on the need for close and consistent supervision by non-judgmental, supportive tutors who had updated knowledge and skills. One NMT noted:

"Sometimes the attitudes of clinical instructors and supervisors; when they go for supervision instead of the tutor coming in a friendly manner so that you should learn, when she comes, she finds you conducting a delivery and maybe according to her you are not following the way she taught you. Instead of her teaching you in a proper manner she starts shouting–'is this the way I taught you, you are just staying here?' So that the student, instead of welcoming you in a proper manner and listening to you so that she can learn from you, she becomes afraid and in that way she cannot learn, that is why you see students running away when the tutor is coming".

Another participant said:

"Like in this case, students are just sent to various hospitals without any supervision and it is really hard to know whether [they are] doing what they learnt or not".

DISCUSSION

Task analysis findings were used to guide pre-service syllabus and curriculum revision; the findings helped shift a revision process that was initially consultative and academic to a more holistic, evidence-rich process that pre-identified practice and training gaps. As a result, a syllabus revision task force comprising 23 nursing and midwifery experts was able to address content needs that were previously unknown or undocumented. A recommendation made by the facilitation team to the task force was that results should not be used in isolation to inform syllabus revision; rather, task analysis findings were one component of a constellation of suggested resources, including the latest version of national clinical guidelines documents and other clinical references, current job description and scope of practice documents for nursing and midwifery cadres, and the collective clinical expertise of the task force. The task force was encouraged to pay special attention to areas that were highlighted as gaps during the task analysis (for example, training in HIV clinical management), keeping in mind that results were intended as one of many guides for syllabus revision.

Contextualization of participant responses

An important lesson learned from the task analysis implementation was the influence of work location on participant responses. Participant responses may have been skewed by work location, and specifically, facility level. For example, low reports of frequency of TB tasks (17.4%) coupled with reports of low perceptions of competency (42%) and a majority of participants (53%) learning TB tasks outside of college were initially unexpected findings, as TB patients present to every level of clinical facility in Malawi. However, subsequent discussions with public health experts revealed that the types of TB tasks encountered at a health facility are strongly dictated by the level of facility. The initiation phase of TB treatment happens most often in TB wards at secondary or tertiary hospitals. Primary-level sites are responsible for the follow-up of TB patients following the initiation phase of treatment. Also, paediatric TB care is normally covered by paediatricians instead of nurses because of the complexities in paediatric diagnosis.

Consequently, NMTs working at primary health care sites would likely respond to the questionnaire differently than NMTs working in hospitals would.

Such information helps to contextualize the task analysis and make it more accurate and meaningful for syllabus and curriculum revision. For all the tasks and disease categories, therefore, the results presented here need to be interpreted within the specific context of how health care is delivered for specific disease categories and in sites of practice, or level of health care facility. The task analysis underscored the importance of teaching NMT students about the variances of clinical practice across different facility types. Matching participants with relevant task analysis questions and FGDs according to their ward or specialty might have yielded different and more applicable task analysis results.

Overall trends

The task analysis generated a large and almost unwieldy amount of data that provided some challenges with interpretation and ability to develop practical applications for syllabus revision. The trends noted in Figures 1 to 3 were helpful to examine, but difficult to consider in isolation. The team found it best to consider all three areas: frequency of performing tasks, perceptions of competency level, and location of learning (college or elsewhere), when it comes to formulating recommendations. In general, the task analysis team suggested the following interpretive formulas in framing recommendations for the task force:

Tasks with high frequencies of performance, high perceived competency levels, and high frequencies of being learned in college

If the qualitative findings neither corroborated nor negated these results, the team recommended that the task force review the topics for minor updating of content according to the latest clinical standards. An example of this included general midwifery tasks (excluding obstetric complications). Majority of the respondents reported a higher frequency of performance, felt competent with tasks, and reported that they learned these tasks in college.

Tasks with low frequencies of performance and low perceived competency levels

For these tasks, the team cross-checked the qualitative findings to identify if there was a need for additional training in that particular clinical category. Reports of low competency in a particular clinical area could signal a need to re-examine how the specific content is leveled for

the NMTs in comparison to higher level nursing midwifery cadres. In some cases, NMTs voiced a need for more in-depth content during their training. For example, in the family planning part of the midwifery category, participants reported low levels of frequency and competency with the tasks of contraceptive rod and IUD insertion. During FGDs, participants also stressed the need for additional training (theoretical and practicum) in long-term family planning methods. The team made recommendations for syllabus content changes based on these findings.

In cases where low levels of frequency and competency were reported in the absence of additional qualitative evidence of training gaps, the team cross-checked the clinical category against the list of priority health conditions in the HSSP. If the clinical category was listed in the HSSP (MoH, 2011b), then the team recommended that the task force explore the need for content strengthening in the syllabus. Cancer and the NTDs part of the infectious diseases category followed this pattern. Low frequencies of these tasks could be explained by rare occurrence of NTD or cancer cases presenting to the participants at work, or by NMTs not having the ability to diagnose the cases. Because these diseases were included in the HSSP, the team recommended that basic information on these topics be included in the NMT syllabus with an aim to clarify the NMT scope of practice in these areas, as well (It is unclear if the role of the NMT in NTDs and cancer had ever been clearly articulated. Until the NMT scope of practice for NTDs and cancer is reviewed and clarified, it will be difficult to know what specific content needs to be included in the syllabus).

Tasks newly added to the NMT scope of practice

The scope of practice and role of nurses and midwives has expanded with the introduction of Option B+ for PMTCT, other changes in the 2011 national HIV guidelines, and the scale-up of voluntary medical male circumcision service delivery for HIV prevention. Changes in nursing roles are not yet clearly reflected in the official scope-of-practice document for nurses and midwives. Reflection of these new roles in the scope of practice should help to guide content development in syllabi and curricula for all nursing cadres. The team recommended content relevant to the new topics to be included in the NMT syllabus, and be updated again when the scope of practice is clarified.

Infectious diseases and midwifery

The task analysis findings pointed to clear gaps in specific clinical content areas, including infectious diseases, obstetric complications, and family planning.

The results identified areas that were not adequately covered during pre-service training programmes, such as HIV content. As a result of the findings for infectious diseases, especially the HIV-specific results, the task force decided to develop a new course for NMTs called "Communicable and Neglected Diseases", which would cover topics such as pathophysiology, modes of transmission and infection control, infection prevention, and laboratory tests for priority infectious diseases in Malawi, such as HIV, TB, malaria, neglected tropical diseases and other disease entities. Based on FGD results, the task force also moved to strengthen clinical teaching by adding more skills laboratory and clinical attachment hours for certain courses. The task force recommended that students be required to do a clinical rotation at an ART clinic to help strengthen their HIV skills. Recommendations were also made to strengthen clinical teaching and reinforce curriculum content on obstetric complications and family planning based on input from task analysis participants. These changes were made in the hopes of strengthening NMT competency levels for managing diseases which strongly contribute to morbidity and mortality in the country's population.

NMT training programme considerations

The task analysis provided an opportunity for the NMCM as well as leadership at NMT training institutions across Malawi to gain deeper insights into some of the systems-related barriers that have served as obstacles to learning during participants' training programmes. NMTs talked about the need for strengthening clinical teaching in terms of tutor/clinical instructor presence at clinical attachment sites as well as improving the quality of didactic and clinical teaching. These are important considerations for improving NMT educational programmes. A strongly improved NMT syllabus will have limited value if the proper infrastructure is not in place to support syllabus and curriculum implementation at the institutional level.

Additional applications for task analysis data

In addition to implications for NMT syllabus and curriculum revision, the task analysis findings have relevance for in-service training foci and for developing training programmes that can fill educational gaps either not addressed during pre-service education or that pertain to new clinical standards and new guidelines that practicing NMTs need training on. Conducting periodic task analyses can inform priority topics for clinical education for nurses and midwives, and identify where training and practice are in alignment, or where disconnects

have emerged. A task analysis can help identify where nurse midwives have strong competency (such as the positive findings about high reported competency levels with majority of the 62 NMT midwifery skills included in the questionnaire) as well as areas that need strengthening (such as HIV/AIDS clinical management).

Finally, with a broader view of human resources for health, the task analysis process highlighted the importance of clearly articulated scopes of practice for NMTs and other nursing cadres. A well-written and thoughtful scope of practice document can help guide not only the task analysis process but also the design of subsequent pre- and in-service training programmes. A thorough understanding of the NMT role vis-à-vis their RN counterparts, for example, can provide critical context for planning and managing human resources for health in resource-constrained health systems. When initially perceived, the task-shifted role of the NMT at the technician level was designed to cover basic nursing and midwifery competencies as compared to the role of higher level RNM cadres which included advanced level tasks, such as managing obstetric complications. As a result, the NMT curriculum was purposively designed to exclude specific clinical content that would be covered by higher level cadres. The Nursing Council may need to reexamine the scope of practice for the NMT cadre taking into account human resource limitations and weak referral systems that may result in NMTs being burdened with clinical tasks that they may not have been trained to perform.

Conclusion

A task analysis is a valuable method for gathering evidence needed for reforming pre-service education for nurses and other health care cadres. A task analysis does not take the place of observational studies for measuring task frequency and competence of health cadres, but still provides useful information about everyday practice of nursing and midwifery cadres that can guide both policy and education reform. The task analysis in Malawi armed the national NMT syllabus revision task force with critical information regarding content revisions that should serve to better prepare NMTs to provide quality care. The task force would have likely been unaware of these important content areas in the absence of the NMT task analysis.

A task force or other group empowered to review and revise syllabi and curricula needs to consider the results of a task analysis alongside other evidence, such as expert content review, priority health conditions in a country and the capacity of colleges or training institutions to implement a newly revised curriculum. When implementing a task analysis, care should be taken to thoroughly understand the health care worker's job

context, especially considering the different levels of the health care system they work in and the various other health care cadres they work with and task share with. To make progress on MDGs and other nationally recognized priority health conditions, attention needs to be placed on the training needs of nurses, midwives, and other health care workers, as their level of knowledge and skill is a critical link to improving health outcomes for all. A task analysis provides a data-driven platform for making the necessary revisions to transform a pre-service programme into an educational experience for nurse midwife cadres that is practically and strategically based on the realities of practice on the ground and the health needs of a population. Neighboring countries in the sub-Saharan region should consider using task analyses to help strengthen curricula and other components of educational programmes for their nurses and midwives.

LIMITATIONS

Although the team did attempt to obtain a representative sample of practicing NMTs for this study, only 20 out of 28 districts were represented, perhaps partly due to informal undocumented staff transfers and delays in updating the NMCM database. Also, the final sample size of 48 NMTs was small, and thus the findings presented here are not generalizable to other settings.

Because majority of the participants worked in hospital settings, the results may not accurately represent the realities of NMTs who practice in smaller health centres. The lack of stratification of the sample by clinical specialty may have contributed to more variable responses across task analysis questions. In addition, the database used for the sampling frame for the NMT population in Malawi was incomplete and at times had erroneous information, such as including non-NMT nurse midwifery cadres in the database (This likely contributed to the initial inclusion of RNMs in the first task analysis workshop in Lilongwe).

Self-reporting of frequency of tasks and competency level introduces an inherent bias. Also the tasks included in the task analysis questionnaire may not have been the most relevant tasks in NMT practice. Even though the task analysis questionnaire was reviewed and piloted by 6 NMTs, there were important practice issues that the team overlooked prior to finalizing the tool. For example, TB tasks are highly differentiated according to practice site in Malawi. Initiation of treatment tends to occur at larger hospital settings, whereas maintenance treatment and monitoring traditionally takes place at smaller health centers. This distinction should have been more clearly stated in the tasks included in the TB section of the questionnaire. It is also possible that the quality or accuracy of participant responses may have diminished over time due to test-taking fatigue. Including an

observational component of NMTs in their practice settings would have helped to substantiate self-reported results with objective findings.

The FGDs ideally would have been conducted in the participants' native language rather than English. Variability in facilitation styles and other characteristics of the five different facilitators (e.g., country of origin) may have influenced how participants responded. Although the team pledged confidentiality at the beginning of the FGDs, NMTs may have been reserved with their participation, as NMCM is a regulatory body.

Conflicts of Interest

The authors on this paper declared that they have no conflicts of interest.

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REFERENCES

Fabrey LJ, Walla J (2004). A national job analysis of the critical care nurse specializing in cardiac medicine. Conducted for the American Association of Critical-Care Nurses Certification Corporation (AACN-CC). Available at: http://www.aacn.org/wd/certifications/docs/cmcjobanalysisexecsumm.pdf

Battisto D, Pak R, Vander Wood MA, Pilcher JJ (2009). Using a task analysis to describe nursing work in acute care patient environments. J. Nurs. Adm. 39(12):537-547.

Commonwealth Foundation (2013). National report Malawi: A civil society review of progress towards the Millennium Development Goals in Commonwealth countries. Commonwealth Foundation, London, United Kingdom. Available at: http://www.commonwealthfoundation.com/sites/cwf/files/downloads/MDG%20Reports%20Malawi_FINAL_1.pdf

Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, Fineberg H, Garcia P, Ke Y, Kelley P, Kistnasamy B, Meleis A, Naylor D, Pablos-Mendez A, Reddy S, Scrimshaw S, Sepulveda J, Serwadda D, Zurayk H (2010). Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. Lancet 376:1923-1958.

Fullerton J (1988). American nurse-midwifery: a task analysis approach to assessment of professional practice. Midwifery 4(4):177-183.

Fullerton J (1994). 1994 task analysis of American certified nursing midwifery. J. Nurse Midwifery 39(6):348-357.

Mbambo S, Uys LR, Groenwald B (2003). A job analysis of selected

health workers in a district health system in KwaZulu-Natal. Part two: Job analysis of nurses in primary health care settings. Curationis 26(3):42-52.

Ministry of Development Planning and Cooperation, Government of Malawi (2010). 2010 Malawi Millennium Development Goals report. MDPC, Lilongwe, Malawi. Available at: http://planipolis.iiep.unesco.org/upload/Malawi/MalawiMDGs2010Report.pdf

Ministry of Health, Government of Malawi (2011a). Malawi health sector strategic plan 2011-2016: moving towards equity and quality. Ministry of Health, Lilongwe, Malawi. Available at: http://www.mamaye.org/evidence/malawi-health-sector-strategic-plan-2011-2016

Ministry of Health, Government of Malawi (2011b). Clinical management of HIV in children and adults: Integrated guidelines for providing HIV services in antenatal care, maternity care, under 5 clinics, family planning clinics, exposed infant/pre-ART clinics, ART clinics. Ministry of Health, Lilongwe, Malawi. Available at: http://www.who.int/hiv/pub/guidelines/malawi_art.pdf

Moore DS (1985). Task analysis. J. Nurse Midwifery 30(2):117-112.

Moore FI (1999). Functional job analysis: Guidelines for task analysis and job redesign. World Health Organization (WHO). Available at: http://www.who.int/hrh/tools/job_analysis.pdf

NMCM (2009). Nurse and Midwifery Technician Syllabus. NMCM, Lilongwe, Malawi.

Udaya A, Subah M, Drake M, Ng C, Johnson P (2011). Task analysis: An evidence-based methodology for strengthening education and training of nurses and midwives in Liberia. Int. J. Nurs. Midwifery 3(9):118-127.

Uys LR, Groenewald B, Mbambo S (2003). A job analysis of selected health workers in a district health system in KwaZulu-Natal. Part one: Job analysis of nurses in hospital settings. Curationis 26(3):32-41.

APPENDIX A: LIST OF TASKS INCLUDED IN THE NMT TASK ANALYSIS QUESTIONNAIRE

Midwifery section

Antenatal care (ANC)

(1) Educate pregnant women (and their partners if available) on methods to prevent HIV infection and other STIs.
(2) Initiate and follow-up anti-retroviral treatment (ARV) for HIV positive women according to 2011 national guidelines.
(3) Provide intermittent preventive malaria treatment (IPT).
(4) Perform malaria testing at ANC visits.
(5) Check hemoglobin on all pregnant women, treat anaemia with iron tablets, and arrange for follow-up testing.
(6) Screen all pregnant women for STIs.
(7) Administer treatment to all pregnant women who test positive for STIs per protocol.
(8) Identify signs of pelvic inflammatory disease (PID) during pregnancy.
(9) Provide treatment (or refer to next level health facility, if indicated) for PID during pregnancy.
(10) Identify signs of urinary tract infection during pregnancy.
(11) Administer treatment for urinary tract infection during pregnancy.
(12) Assess antenatal bleeding and appropriately manage or refer.
(13) Calculate the estimated date of delivery (EDD) of each woman at the first ANC visit.
(14) Provide nutritional education to all pregnant women.
(15) Treat pregnant women for intestinal parasites.
(16) Perform assessment of fundal height and foetal heart rate at each ANC visit.

Normal labour and early postpartum care

(1) Use the partograph according to WHO guidelines to monitor and document every woman during labour, delivery, and postpartum.
(2) Perform vital signs on admission in labour.
(3) Perform an abdominal exam (assessing contractions, foetal presentation, and foetal heart rate) on admission in labour.
(4) Perform a sterile vaginal examination on admission in labour.
(5) Perform active management of third stage labour (AMSTL) at each delivery.
(6) Perform episiotomy.
(7) Repair 1st and 2nd degree lacerations.
(8) Monitor the woman for bleeding for 4 to 6 h after delivery.
(9) Teach woman to massage the uterus, how to know if her bleeding is too much, and how to get help immediately.
(10) Before discharge, explain to the mother the restrictions and danger signs in the postpartum period and advise them to go to the postnatal clinic if they became ill during the next 6 weeks.
(11) Document each delivery and referral made in the labour register.
(12) Compile monthly delivery statistics.

Newborn care

(1) Place newborn skin-to-skin on mother's chest and assure that baby is warm, dry, and breathing well immediately after birth.
(2) Assign 1- and 5-min Apgar scores.
(3) Help the mother initiate breast feeding within 60 min of birth.
(4) Provide immediate newborn resuscitation at delivery.
(5) Provide discharge teaching to parents (to include danger signs in the newborn, proper care and feeding, exclusive breastfeeding for first 6 months, and cord care).
(6) Identify "at risk" baby and appropriately manage or refer as needed.
(7) Conduct newborn exam before discharge.
(8) Give immunizations and prophylactic medicines per protocol before discharge.
(9) Advise parents of recommended newborn visit schedule before discharge.

(10) Evaluate neonatal deaths for tetanus.

Postpartum care

(1) Counsel woman and partner on their plans for future pregnancies and contraceptive methods.
(2) Explain the principles of PMTCT to families.
(3) Provide postpartum care visits after each woman's discharge from the facility.

Obstetric complications

(1) Provide ART prophylaxis during labour.
(2) Identify obstructed labour and initiate intervention and/or referral.
(3) Initiate labour augmentation using oxytocin for prolonged labour.
(4) Identify prolonged or preterm rupture of membranes and manage or refer appropriately.
(5) Perform vacuum extraction deliveries.
(6) Identify and provide the initial treatment for severe preeclampsia and eclampsia, including referral to next level of care.
(7) Manage postpartum haemorrhage (PPH) using uterotonic medications and bimanual compression of the uterus.
(8) Perform manual removal of placenta.
(9) Provide blood transfusion.
(10) Perform breech deliveries.
(11) Perform twin deliveries.
(12) Identify and provide initial management for prolapsed umbilical cord.
(13) Identify and refer malpresentation that cannot be delivered vaginally.
(14) Manage shoulder dystocia.

Family planning

(1) Counsel woman (and partner) on their plans for future pregnancies and contraceptive methods.
(2) Inform woman of risks, side effects, and other options of family planning methods.
(3) Perform physical exams and tests to determine medical eligibility for the family planning method the woman chooses.
(4) Insert contraceptive rods.
(5) Insert IUDs.
(6) Provide contraceptive injections.
(7) Provide birth control pills.
(8) Provide male and female condoms.

Infectious disease section

HIV

(1) Provide HIV-screening to children under 24 months who are born to HIV-positive mothers.
(2) Counsel parents on approaches for disclosing HIV status to paediatric patients.
(3) Support newly diagnosed HIV patients to cope with psychosocial and emotional pressures.
(4) Test high-risk patients for HIV according to "opt-out" protocol.
(5) Facilitate timely enrollment of exposed infants (including those breastfeeding from HIV infected mothers) into HIV care.
(6) Determine eligibility of HIV patients for ART according to CD4 counts and clinical staging.
(7) Provide CPT to HIV patients.
(8) Routinely screen HIV patients for active TB.
(9) Provide counseling on infant and child feeding to HIV-positive mothers.
(10) Provide adherence counseling to HIV patients.

(11) Prescribe and dispense ART for HIV-positive mothers.
(12) Prescribe and dispense ART for paediatric patients.
(13) Initiate post-exposure prophylaxis (PEP) for eligible patients with risky exposures in the last 72 h.
(14) Identify and monitor HIV-related diseases such as oral candidiasis, chronic diarrhoea, TB, shingles (herpes zoster), etc., using the standard clinical monitoring checklist for HIV patients.
(15) Screen for ART medication side effects using the standard clinical monitoring checklist.
(17) Treat HIV-related diseases such as oral candidiasis, chronic diarrhoea, TB, shingles (herpes zoster), etc.
(18) Provide counseling for family planning (condoms and Depo-Provera) to HIV patients.
(19) Provide counseling on Prevention with Positives interventions, e.g., ART adherence and recognizing symptoms of STIs, to HIV positive patients.
(20) Link HIV positive patients to appropriate community programmes and local resources.
(21) Identify and diagnose cases of HIV treatment failure.
(22) Compile monthly facility HIV reports for ANC, maternity, and exposed child follow up visits.

TB

(1) Collect sputum samples for suspect TB cases.
(2) Refer a patient for chest x-rays when indicated.
(3) Directly observe patients who are taking Rifampicin as part of their TB treatment.
(4) Take a focused history to help establish a TB diagnosis in children.
(5) Start a TB or TB/HIV master card for a patient with TB.
(6) Perform counseling and testing for HIV on a patient who has been started on anti-TB medications in the last two weeks.
(7) Follow up with a TB patient every two weeks for first two months.
(8) Follow up with a TB patient monthly (after the first two months).
(9) Start patients with TB and HIV co-infection on cotrimoxazole.
(10) Update the TB registry.
(11) Assist with quarterly analysis of case finding and treatment outcomes.

Malaria

(1) Provide education on malaria prevention, especially for high-risk groups, such as Under 5's and pregnant women.
(2) Conduct comprehensive assessments for suspected malaria cases, including focused history-taking, physical exam, and ordering relevant diagnostic lab tests.
(3) Treat uncomplicated malaria according to national protocol.
(4) Treat and/or refer severe malaria cases according to national protocol.

Acute respiratory infections

(1) Use standard case management (SCM) guidelines to diagnose pneumonia.
(2) Evaluate children for fast breathing and chest in drawing.
(3) Provide treatment for cases of pneumonia in adults with antibiotics when indicated.
(4) Provide treatment for cases of pneumonia in children with antibiotics when indicated.
(5) Educate family members on when to bring in a child with a respiratory ailment.

Diarrhoeal diseases

(1) Classify type of diarrhoeal disease.
(2) Provide ORS and intravenous rehydration to patients.
(3) Evaluate patients for severe dehydration.
(4) Provide antibiotics when indicated for diarrhoeal disease.
(5) Treat child for severe persistent diarrhoea and dysentery.

(6) Educate patients and caregivers on interventions to prevent diarrhoea.
(7) Teach caregivers how to make and administer oral rehydration salts.

Neglected tropical diseases

(1) Participate in UNICEF Child Health Days or other mass praziquantel or albendazole administration activities.
(2) Identify patients with complications from schistosomiasis (bilharzia).
(3) Train teachers in soil transmitted helminth control.
(4) Train community health workers in schistosomiasis.
(5) Prescribe antibiotics or antifungal medications for patients with lymphatic filiariasis.
(6) Provide supportive treatment for lymphatic filiariasis (such as frequent exercise of affected limb, hygiene measures for affected limb, etc).
(7) Treat patients with trachoma with tetracycline.
(8) Refer patients to surgery for trichiasis.
(9) Treat patients with leprosy.

Eye, ear, and skin infections

(1) Provide treatment to patients with scabies.
(2) Treat tinea corporis (ringworm).
(3) Perform incision and drainage (I&D) procedures when indicated.
(4) Prescribe antibiotics for patients with cellulitis.
(5) Refer patients with severe cellulitis or with recurrent cellulitis that does not respond to first line antibiotics.
(6) Identify and refer patients with Stevens Johnson Syndrome.
(7) Provide supportive treatment, e.g. IV fluids, analgesic medications and wound care, to patients with Stevens Johnson Syndrome.
(8) Diagnose non-bacterial conjunctivitis (e.g., from viral or allergic causes).
(9) Diagnose bacterial conjunctivitis.
(10) Treat patients with bacterial conjunctivitis.
(11) Refer patients with suspected herpes zoster ophthalmicus.
(12) Diagnose patients with acute otitis media.
(13) Provide treatment for acute otitis media.
(14) Diagnose patients with cataracts.
(15) Diagnose patients with glaucoma.
(16) Diagnose patients with vitamin A deficiency, leading to blindness.

Vaccine preventable diseases

(1) Participate in immunization clinics for Under 5's.
(2) Practice cold chain maintenance.
(3) Vaccinate women of childbearing age with tetanus toxoid.
(4) Record immunization data on health passports.
(5) Send stool samples to test for polio in patients who have acute flaccid paralysis.
(6) Send blood samples to test for measles in patients who have fever, cough, and a maculopapular rash.
(7) Report surveillance and vaccine information to the district.

Malnutrition

(1) Take weight measurements of patients.
(2) Take height measurements of patients (or length for infants).
(3) Calculate weight for height index and identify malnourished patients.
(4) Evaluate adult men and women who are neither lactating nor pregnant for malnutrition using BMI.

(5) Take the mid-upper arm circumference (MUAC) measurement.
(6) Evaluate for nutritional oedema.
(7) Record nutritional status findings in the health passport.
(8) Refer malnourished patients to the supplementary feeding programme (SFP)/Nutrition Rehabilitation Unit (NRU)/Therapeutic Feeding Programme (TFP) as indicated
(9) Administer micronutrient supplements (e.g., iron, folic acid and vitamin A) to Under 5's.
(10) Administer albendazole to under 5's.
(11) Administer Likuni Phala and vegetable oil rations and/or plumpy nut to malnourished patients and/or their guardians.
(12) Evaluate patients for usual causes of failure to respond to malnutrition treatment.
(13) Offer HIV testing to patients whose cause of malnutrition is not obvious.

Cancer

(1) Assess women for abnormal cervical cells using the VIA (visual inspection with acetic acid) method.
(2) Perform cryotherapy on precancerous lesions.
(3) Refer patients with cervical lesions.
(4) Refer children with suspected Burkitt's lymphoma.
(5) Perform supportive care (wound care, pain management) for patients with Kaposi's Sarcoma.

Non-communicable diseases

Overweight/Obesity

(1) Assess patient BMI to evaluate for overweight and obesity.
(2) Teach patients management of overweight and obesity through nutrition and activity.

Diabetes

(1) Evaluate patients for signs and symptoms of diabetes.
(2) Assist patients to manage their diabetic medication regimens, including oral medications and/or insulin.
(3) Evaluate patients for complications of diabetes, such as neuropathies.
(5) Manage patients who have acute hypoglycaemia or hyperglycaemia.
(6) Teach diabetic patients about nutritional management of their diabetes.

Cardiovascular disease/hypertension

(1) Monitor blood pressure three times over more than one day to evaluate for hypertension.
(2) Educate hypertensive patients about management of hypertension through diet and exercise.
(3) Refer patients with stages 1 or 2 hypertension immediately.
(5) Monitor blood pressure and pulse before administering antihypertensive medications.
(6) Educate patients on how to recognize warning signs of hypertensive emergencies (including severe headache, numbness and tingling in face or extremities, confusion).

Asthma

(1) Evaluate patients for asthma.
(2) Refer severe asthmatic patients who are not responding to conventional treatment.
(3) Educate patients on air pollution and triggers for asthma.
(4) Administer nebulizers to patients in immediate respiratory distress due to wheezing.

Hearing loss

(1) Screen patients for hearing loss.

Trauma and emergency care

(1) Identify signs of shock, that is, weak, fast pulse, low BP, cold, clammy skin, fast and shallow breathing.
(2) Identify cause of shock and initiate treatment per protocol.
(3) Initiate rapid assessment for convulsions.
(4) Treat the cause of convulsion if known, that is, high fever, eclampsia, epilepsy, infection (meningitis), hypoglycemia.
(5) Refer cases of severe convulsions.
(6) Document morbidity and mortality per national protocols (death audit, cause of death noted in facility records, etc).
(7) Stabilize patients with a traumatic injury.
(8) Assist patients in rehabilitation after traumatic injury.

Clinic systems tasks

(1) Forecast medications for your clinic setting.
(2) Take inventory of other medical supplies in your clinic setting.
(3) Develop or monitor budgets at your clinic setting.
(4) Supervise any staff in your clinic setting.
(5) Supervise/mentor students in your clinic setting.
(6) Provide educational sessions for other clinical staff at your clinic.
(7) Lobby for the availability of necessary supplies and equipment in your clinical setting in order to promote quality clinical care.
(8) Regularly review research findings in order to practice evidence-based nursing care.

Mental illness

(1) Evaluate patients for depression.
(2) Refer patients with mental health issues.
(4) Evaluate patients for substance abuse.

Community nursing

(1) Perform a community health assessment of important health issues for your community.
(2) Provide community home-based care for people with chronic illnesses.
(3) Provide palliative care including psychosocial and spiritual care for those with terminal illnesses.
(4) Collaborate with community health workers, e.g., Health Surveillance Assistants, to address important health issues for your community.

APPENDIX B: KEY RECOMMENDATIONS MADE FOR SYLLABUS REVISION

General nursing

(1) Given their contributions to morbidity and mortality, strengthen content for HIV, tuberculosis (TB), malaria, and other infectious diseases in the revised NMT syllabus, curriculum, and clinical teaching through the addition of a new infectious diseases course.
(2) Require HIV clinic rotations for students as a requirement for graduation, and emphasize the differences in approaches to HIV clinical management across health facilities (e.g., central hospital vs. urban health centre) in the syllabus under classroom and clinical teaching.

(3) NMCM to clarify the role of NMTs and other nurse midwife cadres in relation to prevention and clinical management of NTDs, cancer, and HIV clinical management and prevention, so that the appropriate content gets incorporated into pre-service training content.

Midwifery

(4) Strengthen ANC-related HIV content, particularly antiretroviral medications in labor and other midwifery settings.

(5) Strengthen content on obstetric complications (preeclampsia, shoulder dystocia, resuscitation of the newborn, postpartum haemorrhage, and breech delivery).

(6) Introduce a smaller student/patient ratio during midwifery clinical rotations, and/or add clinical attachments in facilities more likely to have complicated midwifery cases so that students have more exposure to complicated cases.

(7) Develop a more detailed outline of content for family planning in the community nursing course, and add content on the contraceptive rod and IUD insertion.

(8) Strengthen theoretical, skills lab, and clinical teaching for midwifery subjects to improve training gaps.

General Syllabus Revision Recommendations

Suggestions were made to college faculty and administrators to help with syllabus implementation:

(1) Review curriculum and course outlines at the college level to ensure adequate midwifery content and to strengthen content as needed.

(2) Explore further why students do not learn tasks. Is it due to omissions in the syllabus, mode of instruction, lack of coverage during clinical rotations, or other reasons? This issue should be followed up during development of the core NMT curriculum.

(3) Ensure that the syllabus and clinical practicum is evidence-based reflecting the latest research and current clinical practices for all medical conditions and procedures.

The following additional recommendations were made at the broader national level:

(1) The Task Force was encouraged to consider recommendations for strengthening clinical teaching.

(2) The Task Force was encouraged to include content regarding variances in scope of practice for NMTs at rural health centres, urban health centres, district hospitals, and central hospitals for each major disease condition.

(3) Nursing pre-service stakeholders will want to continue examining task-shifting across midwifery cadres to ensure that tasks are balanced across cadres. This will help to inform the appropriate leveling of content for syllabi and curricula.

(4) The Task Force should develop guidance for how often the syllabus should be updated and revised to help ensure quality.