

Case Study: Using Task Analysis to Determine the Status of Education and Practice of Medical Licentiates for the Provision of Anesthesia in Zambia



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Abstract

Task analysis methodology was used to identify gaps in the education and practice of Medical Licentiates, a cadre of primary care health providers in Zambia, related to the provision of anesthesia. Findings of the analysis indicate that Medical Licentiates who work in facilities where there are no fully qualified anesthesiologists or physicians often feel obligated to provide these services in order to save lives although they lack sufficient formal education or clinical practice opportunities. The government translated the findings into immediate modifications to the education, training and practice of anesthetic tasks by Medical Licentiates by developing an elective course within the pre-service education program and upgrading the certification of Medical Licentiates to a bachelor's degree.

Introduction/Background

Zambia, in sub-Saharan Africa, is one of 57 countries experiencing a critical shortage of human resources for health, with fewer than 23 health workers per 10,000 population, a critical threshold below which a country is unlikely to be able to meet health service coverage needs (Government of the Republic of Zambia 2013; WHO 2010). Recent estimates cite the density of physicians and nurses in Zambia as 0.17 and 0.78 per 1,000 (1.7 and 8.8 per 10,000) respectively (WHO 2014). Health worker shortages are further impacted by regional differences. The physician-to-population ratio in the urban capital of Lusaka is double that of more rural areas (Government of the Republic of Zambia 2011a), which often have high vacancy rates for all health workers (Ferrinho et al. 2011). As a result, the majority of Zambians in rural or remote areas do not have access to health services (Government of the Republic of Zambia 2011b).

Zambia and 25 other sub-Saharan African countries address this imbalance by educating and training a cadre of associate clinicians to fill the gap in medical services (Henry et al. 2015). These providers typically have backgrounds as clinical officers; in Zambia, these associate clinicians are known as Medical Licentiates and provide an array of health services ranging from basic primary care to essential surgical services.

Zambia's first Medical Licentiate program was initiated in 2002 at Chainama College of Health Sciences (CCHS) and, at the time of this case study, it was the only Medical Licentiate education program in Zambia. The three-year program prepares clinical officer generalists to provide medical care, including emergency services, at the district and provincial levels of the health system (Government of the Republic of Zambia 2002). Medical Licentiates are most commonly deployed to high-need areas, often in rural and remote facilities, where they may be the only provider with medical and surgical skills.

The demand for Medical Licentiate services focused attention on the scope of practice and the education necessary to support high-quality care. National pre-service education guidelines for the health professions recommend that the curriculum of studies be reviewed every five years (Government of the Republic of Zambia 2006), but, as of 2010, the Medical Licentiate curriculum had not been updated since 2002 to reflect current evidence-based knowledge and trends in practice. In addition, Medical Licentiates were expressing a general dissatisfaction regarding the lack of precision in the definition of their scope of practice and the perception that the academic credential that they were awarded did not adequately reflect their responsibilities for clinical practice in the workplace.

Stakeholders (educators, representatives of the Ministry of Health, Medical Licentiate providers, representatives of the professional association and technical assistance agencies) convened a consensus-building meeting to determine a way forward. A task analysis was unanimously supported and endorsed as a way to identify gaps in education and practice for the Medical Licentiate cadre. This case study examines selected findings related to the provision of anesthesia extracted from the larger task analysis study that focuses on the full scope of work of Medical Licentiates. This case study also describes subsequent government and stakeholder responses to identified gaps in education and practice in this limited domain.

Intervention

Task analysis is an evidence-based research methodology used to systematically assess the knowledge, skills and professional behaviors of health workers (Althouse 2000; Hart et al. 2015). The list of knowledge, skills and behaviors related to Medical Licentiates provision of anesthesia was identified through a review of the cadre's existing curriculum, job description and national practice guidelines issued by the Ministry of Health and through a review of the literature addressing evidence of quality and safety of associate clinicians' practice of anesthesia skills (Bergstrom 2015; Henry et al. 2015). The list was edited and verified by an expert panel knowledgeable about Medical Licentiate education and practice.

Human subjects research approval for the task analysis study was received from the Johns Hopkins Bloomberg School of Public Health Institutional Review Board. Permission to conduct the study was granted by Chainama Hills College Hospital Administration and the Zambia Ministry of Health.

Methodology

Convenience sampling targeted the 116 Medical Licentiates currently working in public and private health facilities in Zambia

identified through a review of Ministry of Health deployment records and Medical Licentiate Association records. A total of 57 Medical Licentiates working in eight of the nine provinces of Zambia were interviewed, representing 49% of the national Medical Licentiate population.

This study used self-administered data collection tools modified from task analysis studies previously employed in Mozambique and Liberia (Dgedge et al. 2014; Udaya et al. 2011). Participants documented their practice experience with respect to performance of each of three types of anesthesia: local, general and spinal. Respondents also provided additional information by responding to open-ended questions about their role in the performance of anesthesia.

All tools were self-administered in the presence of the interviewer, who was available to answer and clarify any questions. The anesthesia component of the larger task analysis tool (408 items covering the full scope of Medical Licentiate practice) required approximately five to 10 minutes for completion. Medical Licentiate survey respondents provided three responses for each type of anesthesia: the frequency at which the type of anesthesia is performed, where the respondent had received theoretical education for performance of each of the three types of anesthesia and where the respondent had received clinical practice for performance of each of the three types of anesthesia.

Frequency data were analyzed using CSPRO software, SPSS and MS Excel. Thematic analysis was used for qualitative data.

Results

Almost all (n=56; 98.2%) Medical Licentiate respondents reported that in their pre-service education they received theory content for the provision of local anesthesia, with slightly fewer receiving formal pre-service clinical practice to perform spinal (n=50, 92.6%) and general (n=49, 89.1%) anesthesia. The numbers of Medical Licentiates who had not

received pre-service clinical practice for any of the three skills could not be reported as data were incomplete.

Table 1 depicts the frequency at which Medical Licentiates performed each of the three types of anesthetic techniques. Local anesthesia was the type most often administered by respondents (49.1%) who reported performing the task at least one time per week. Spinal anesthesia was least likely to be performed weekly (14%), and general anesthesia was performed weekly by 28.1% of the respondents.

Table 1. Frequency at which Medical Licentiates performed anesthesia tasks (N=57)

| Frequency of Performance | Local n (%) * | Spinal n (%) | General n (%) |
|--------------------------|------------------|-----------------|------------------|
| Daily | 13 (23.6) | 1 (1.8) | 2 (3.5) |
| Weekly | 27 (49.1) | 8 (14.0) | 16 (28.1) |
| Monthly | 7 (12.7) | 15 (26.3) | 5 (8.8) |
| Rarely | 5 (9.1) | 6 (10.5) | 9 (15.8) |
| Never | 3 (5.5) | 27 (47.4) | 25 (43.9) |
| Not done in the setting | 1 (1.8) | 13 (22.8) | 8 (14.0) |
| Done by another worker | 2 (3.5) | 14 (24.5) | 17 (29.8) |
| Total | 55 | 57 | 57 |

* Missing data = 2.

A number of respondents reported that they never administer spinal (n=13, 22.8%) or general anesthesia (n=8, 14.0%) because it was not done in that setting. Similarly, 14 (24.5%) and 17 (29.8%) respectively did not provide these services because another worker performs the task.

Review of responses to the open-ended (qualitative) data revealed that Medical Licentiates, in common, felt unprepared to perform any of these types of anesthesia. Respondents stated that they sometimes found themselves in situations where they felt compelled to administer anesthesia despite feeling unprepared to do so. Nearly all

reported that although their pre-service education included theoretical content, many had not received formal clinical practice, particularly for spinal and general anesthesia, either during their formal education or during their internship. At the time of the study, theoretical content for local, spinal and general anesthesia was taught within surgery and obstetrics coursework rather than as a stand-alone course. All Medical Licentiates were expected to be proficient in, at the minimum, the provision of local anesthesia (Government of the Republic of Zambia 2002). However, opportunities for clinical practice of the two higher-order skills were dependent on the interest of the individual student and the availability of preceptors with anesthesia skills during both their formal education and internship.

Respondents noted that the shortage of clinical preceptors limited access to appropriate supervision, which in turn adversely affected practice opportunities:

Students are taught theory but are not allowed to practice [during pre-service education and internship]. It would be better if they are allowed to practice what they learn.

Medical Licentiates noted the need to provide anesthesia services due to the lack of fully qualified anesthetists in their facilities:

Local and regional anesthesia were only theoretically taught in surgery course. There are no anesthetists in the hospital. So we could use training in it [anesthesia].

Some respondents described the pressure to provide services even though they did not feel adequately prepared:

[Education for anesthesia] is not done adequately. [However] MLs are called to perform anesthetic services.

Discussion

The objective of this task analysis was to describe the work of practicing Medical Licentiates in Zambia and to identify gaps that should be addressed with curriculum revision. Medical Licentiate practice of anesthesia tasks in the workplace was high, despite the lack of emphasis in the curriculum and practice opportunities, which were largely dependent on individual Medical Licentiate interests and the availability of preceptors. This may be attributed to the fact that even though some Medical Licentiates lacked sufficient formal education or clinical practice opportunity, Medical Licentiates felt obligated to provide these services in order to save lives. This interpretation would be consistent with the findings of Ferrinho et al. (2012) in their study of the general health workforce in Zambia. Many Medical Licentiates work in facilities where there are no anesthesiologists or physicians to administer and manage anesthesia services, which likely contributed to the response category of “not done in this setting.” This is typical for most health facilities in Zambia given the existing shortage of health providers.

Task analysis identified gaps in Medical Licentiates’ theoretical education and clinical practice opportunities to acquire the knowledge and skills to acquire competency in the performance of anesthesia tasks. A meeting to disseminate the preliminary results of this study was held with major stakeholders and led to immediate high-level decisions on the training of Medical Licentiates for performance of anesthesia functions. The Ministry of Health supported immediate educational changes, which included a strengthened curriculum and development of elective courses, including a separate anesthesia course. The separate course provides curricular emphasis on anesthesia content as well as increased opportunities for practice during the formal Medical Licentiate education program. Plans for updated skills labs, strengthening practice sites and faculty development at CCHS were included in the

National Training Operational Plan (Government of the Republic of Zambia 2013). The Medical Licentiate qualification was upgraded from a diploma to a bachelor’s degree in keeping with the model of other countries in the region. The Medical Licentiate bachelor’s degree program was initiated in 2013.

Anesthesia is an essential service required for surgical treatment (LeBrun et al. 2014; WHO 2015) and education and training of anesthesia personnel is a cornerstone for providing surgical services. Bergstrom (2015) and Henry et al. (2015) describe the critical need for surgical task shifting in low- and middle-income countries and report the evidence that associate clinicians provide these services with outcomes that are comparable to medical doctors.

This case study provides additional attention to the important role that Medical Licentiates can play in ensuring the provision of anesthesia services in Zambia, and can serve as a model for other countries that use similar cadres of associate clinician personnel to provide essential health services. Development and support of training programs in anesthesia are paramount factors in the provision of available, safe and cost-effective care (Dubowitz and Evans 2012; LeBrun et al. 2014; Sachidanand et al. 2014).

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