

Articles

Non-doctor anaesthesia in Nepal: developing an essential cadre

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SUMMARY Nepal is a mountainous country of 27 million people where the widespread lack of access to operative services is a major cause of morbidity and mortality. One critical reason for this is the lack of trained, appropriately distributed anaesthesia providers. We discuss the evolution of the 'anaesthesia assistant' in Nepal, review the international literature concerning the development of non-doctor anaesthetists, and invite links with others working in this field.

Introduction

The Nepal Health Ministry's objective of providing essential health-care services to all faces enormous obstacles. Although Nepal's surface area is only one quarter that of France, it contains eight of the world's highest mountains, and a topography that rises precipitously from tropical jungles through rugged mountains into the Himalaya. Areas in many of its districts are so remote that people must walk for days to reach the nearest motorable road. The *per capita* income is USD \$251.

Nepal's maternal mortality ratio of 281 is five times higher than that of its neighbours Sri Lanka and China. Less than 20% of deliveries are conducted by a trained health worker, and this figure falls to less than 5% in the poorest regions of the country.¹ While the government has a 2017 target to provide comprehensive emergency obstetric service in all of its 65 district hospitals, at present only 13 (20%) are able to perform caesarean sections.² The capability for caesarean section serves as a good indicator for a range of other intermediate operative procedures – general, orthopaedic and gynaecological.

As of 2003, there were 30 anaesthesia doctors working in government health centres in Nepal³ and all were in urban hospitals. Outside the Kathmandu valley, none of Nepal's district hospitals has an anaesthesia doctor. As a result, even urban hospitals have difficulty recruiting staff. Nepal's premier teaching hospital, located in Kathmandu, hires private locum anaesthesia doctors on a shift basis. Another large urban government hospital depends on a team of non-doctor anaesthetists to staff its operating room.

Development of Nepal's anaesthesia assistant programme

Mission hospitals took the lead in training non-doctor anaesthetists for their hospitals. During the 1970s and 1980s, several foreign anaesthesia doctors conducted non-accredited courses that attracted nurses and non-medical staff who trained as anaesthesia assistants (AAs). Today, many of them are the main anaesthesia providers at some of the large hospitals. In western Nepal, one mission hospital with 160 beds conducts 8000 operations each year, utilizing a staff of six AAs. In 1996, the Nepal government's central hospital initiated a three-month AA training course that was accredited by the government. However, the local anaesthesia doctors frequently challenged the programme and, after three years, they managed to halt the training altogether.

Nepal's Safer Motherhood network vigorously advocated for the AA cadre, recognizing that it was critical to providing caesarean sections. In 2001, Dr Paul Foster developed a six-month AA course, and the Safer Motherhood group's advocacy was important in its gaining government accreditation. For the first three years, this AA training was mainly conducted at two mission hospitals with three to four students in each cohort. Since 2006, two government hospitals have been added as training sites. Nepal's practice-based training provides competency in resuscitation, perioperative care and a range of anaesthetic modalities (regional, ketamine and general using draw-over, Epstein Macintosh Oxford [EMO] and Boyle's machines). This course is used for AA training in Nepal today.

When we followed up the AA trainees at the end of 2006, there were 51 graduates from the six-month course. We located 44 of whom 41 (93%) were working outside the capital city of Kathmandu; 36 were in government service. In Table 1, we compare the present number of government AA graduates with the projected total government need, as estimated by the national Anaesthesia Advocacy Forum.

In 2004, an outside consultant team, which included two senior anaesthesia doctors, assessed 22 of Nepal's AAs.⁴ They found that the AAs were conducting a large number of operations, with 71% providing all forms of anaesthesia. Overall, their performance was judged to be 'very good', although a formal skills assessment was not conducted.

Decisions facing anaesthesia development in Nepal

Given that there are, at most, 20 trainees per year graduating from the four existing sites, the Health Ministry recognizes the need to create more training sites. The Nick Simons Institute is developing training site standards and a national AA training plan. As this process is institutionalized, our group must address a number of issues:

- (1) *Length of training:* Compared with usual worldwide training practice, Nepal's six-month course is short. Although some countries in Africa produce AAs with even less training, more than half the courses in the world exceed two years' duration. In Nepal, we are considering lengthening our training to one year.

Table 1 A comparison of the number of anaesthesia assistants (AAs) currently practicing and the estimated number needed

	District	Zonal	Regional/ central	Total no of AAS
No of hospitals	67	10	10	–
No of AAs currently practicing	20	12	4	36 ^a
Estimated no. required	134	40	60	234

^aSeven former government. AAs could not be located

- (2) *Government career ladder*: The present AA course is run by the Government, but the Ministry of Health has yet to create a specific post or career ladder for this cadre. Graduates simply return to their previous positions as staff nurse or health assistant from which they could be transferred to other postings where no operative services exist.
- (3) *Type of anaesthesia*: A high priority of the training is competence in spinal anaesthesia, as well as in other regional blocks. In addition, depending on the hospital where they are trained, AA students learn on both EMO and Boyles' machines. The Nepal government has yet to develop a standard anaesthesia system for its rural hospitals. Until that occurs, training will often be mismatched with government hospital capabilities.
- (4) *Relation to anaesthesia doctors*: Overall, Nepal's anaesthesia doctors have not embraced the AAs, feeling rather threatened by their lesser-trained colleague. This has hindered the development of the AA field, and limited the number of doctor trainers (and new sites) for the AA course.
- (5) *Name of provider*: Due to the influence of local anaesthesia doctors, the non-doctor providers were called 'anaesthesia assistants'; in theory they were to work under the direct supervision of the anaesthesia doctor. In fact, Nepal's AAs must be able to work independently of an anaesthesia doctor. More appropriate job titles to consider include 'anaesthesia technicians' or 'anaesthesia clinical officers' (the term used in parts of Africa).

World literature on non-doctor anaesthetists

McAuliffe and colleagues found that 107 of the 200 countries that they surveyed used non-doctors to administer anaesthesia 'both general and regional, in rural and urban areas in all regions of the world, and in countries from all levels of development, working with and without anaesthesiologist doctors'.⁵ They found that 60% of these providers had received two or more year's anaesthesia training.⁶

In the USA, nurse anaesthetists administer 65% of all the anaesthetics,⁷ and are the sole anaesthesia providers for 70% of the rural population.⁸ In addition, in the USA, anaesthesia doctors were eight times more expensive to train and three times more expensive to employ than nurse anaesthetists.^{8,9}

Smith evaluated four studies in the international literature of nurse anaesthetists and found no compelling evidence of a difference in patient risk when anaesthesia was delivered by nurse anaesthetists.¹⁰ Abenstein found more anaesthesia-related deaths when anaesthesia was delivered by nurse anaesthetists, but this did not reach statistical significance.¹¹ Simonsen found no difference in anaesthesia-related complications in hospitals in Washington State that were staffed by anaesthesia doctors compared with those staffed by

Table 2 A hypothetical model of anaesthesia outcomes for 10,000 women requiring caesarean section in order to survive (adapted with permission from Freedman L. *JAMWA* 2002;**57**:154)

	Survival (%)	Population coverage	No. of survivors
Anaesthesia doctor	99	10	990
General practice doctor	90	40	3600
Nurse anaesthetist	90	70	6300

anaesthesia nurses alone.¹² Fenton prospectively studied 8070 caesarean sections in Malawi (where all anaesthesia providers were non-doctors) and found 1% maternal mortality in a patient cohort with an extremely high rate of preoperative complications.¹³

Freedman posed a hypothetical example of a country in which there were 10,000 women requiring caesarian section in order to survive (a fair approximation of Nepal) (Table 2). She compared the impact of anaesthesia doctors to non-doctor anaesthesia providers, using a predicted outcome for non-doctors that is pessimistic (only 90% operative success rate, i.e. 10% mortality).¹⁴ The clinical model in which anaesthesia doctors conduct all anaesthesia results in a far greater number of women dying in childbirth.

In moving Nepal's AA programme ahead, we advocate for a fundamental shift in the approach to health care in a resource-limited setting. In Nepal health-care views – i.e. as reported by the press, other public forums and by medical professionals – still lean heavily towards the individual-based, 'highest quality care' model. This a philosophy that best serves those who wield the power and control the resources in the urban areas. In order to meet the health-care needs of the majority of the population who at present are underserved, the paradigm must shift towards a system that trains and supports competent non-doctor providers delivering to a wider population – a model accepted in many other parts of the world.

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