

Training and experience of doctors administering obstetric anaesthesia in the Free State Level 1 and 2 Hospitals

^a Lamacraft G, ^a Kenny PJ, ^a Diedericks BJ, ^b Joubert G,

^a Department of Anaesthesia, University of the Free State

^b Department of Biostatistics, University of the Free State

Correspondence to: Prof Gillian Lamacraft, e-mail: lamacrag.md@ufs.ac.za

SAJAA 2008; 14(2): 13-17

ABSTRACT

Background

All the published Saving Mothers Reports generated by the National Committee of the Confidential Enquiries into Maternal Deaths in South Africa have associated anaesthesia-related maternal deaths with the lack of skills of the doctors administering the anaesthesia. The Reports have shown the Free State to be one of the provinces in South Africa with the highest rate of obstetric anaesthesia deaths. Therefore, the current study was performed to determine whether a deficiency exists in the training and experience of doctors administering obstetric anaesthesia. The identifying of such a deficiency would call for the implementation of remedial measures.

Methods

The study was performed in 2005 using questionnaires designed by the first two authors of this paper. All Level 1 and 2 hospitals in the Free State performing Caesarean sections (CSs) were visited. The doctors administering obstetric anaesthesia were each asked to respond to a questionnaire. The questionnaires enquired about previous training and experience in anaesthesia and, more specifically, obstetric anaesthesia, as well as anaesthesia and nonanaesthesia qualifications. In addition, questions were asked regarding supervision, and whether other duties were performed while administering anaesthesia.

Results

The response rate was 69% (105/148 doctors). Of the respondents, 9.5% were interns, 24.7% community service doctors, 47.6% medical officers, 15.2% general practitioners (GPs) and 2.9% specialists. Twenty-three per cent of respondents had been in their present post for five years or more. Most doctors had received 4 weeks or less training in anaesthesia as an Intern, not including obstetric anaesthesia in 13 cases. Six doctors (GPs or medical officers) had been appointed in posts in which obstetric anaesthesia was required, without previously having administered obstetric anaesthesia. At the time of the survey, two doctors had never performed spinal anaesthesia and five had never administered general anaesthesia for CS, although all were regularly administering obstetric anaesthesia. Apart from the specialists, the Diploma in Anaesthesia was held by only one doctor, a medical officer. Half of the interns were not directly supervised while administering obstetric anaesthesia, while more than half the community service doctors were employed in hospitals where no senior support was available. The doctors frequently had both to administer the anaesthetic and to perform neonatal resuscitation. Twelve of the doctors concerned had often also to perform the surgery itself. Most of the doctors requested further training in obstetric anaesthesia and improved senior anaesthetic assistance.

Conclusions

There is a lack of experience, training and supervision amongst doctors administering obstetric anaesthesia in the Free State. Doctors regularly have to perform other duties, whilst administering obstetric anaesthesia, which may put the mother at risk from inadequate observation. These may be contributory factors to the high rate of maternal deaths from anaesthesia.

Introduction

Maternal deaths in South Africa became legally notifiable in October 1997, in order that information relating to reported deaths could be used to prevent further mortality.¹ The 1999–2001 and 2002–2004 Saving Mothers Reports^{2,3} both found the Free State Province to have one of the highest anaesthesia-related rates of maternal deaths in South Africa. For example, in the triennium 1999–2001, 5.4% of all maternal deaths (direct and indirect) in the Free State were anaesthesia-related, with only Limpopo having a higher rate of such deaths.

Therefore, an investigation was initiated in order to establish contributory factors, with manpower being one of the factors

studied. The Saving Mothers Reports have emphasised that most anaesthetic deaths have been largely due to the inexperience or incompetence of the doctors providing obstetric anaesthesia, and so the training and experience of those administering obstetric anaesthesia was studied. Other contributory factors related to maternal deaths from anaesthesia were also investigated in separate studies.^{4,5} These factors included the method of anaesthesia, and the availability of appropriate anaesthesia drugs and equipment (unpublished data). Neither of these studies found significant factors which could explain the high rate of anaesthesia-related maternal deaths in the Free State.

A survey of training and experience was first performed by the authors in 2003. This study included all the Level 1 and 2 hospitals

in the Free State (no anaesthesia-related deaths had occurred at Level 3 hospitals). Questionnaires were sent to hospital managers for distribution to medical staff administering obstetric anaesthesia. The results suggested that a large number of the doctors administering obstetric anaesthesia were unskilled and unsupervised. This could be a major contributory factor to maternal deaths from anaesthesia in the Free State. However, the response rate was only 33.7% from this initial survey and there could have been bias towards a higher percentage of unskilled and unsupervised responders. To confirm the potentially important findings of this first survey, we thus repeated it with the same questionnaires, but using a different distribution method, which improved the response rate.

Methods

Permission for this study was obtained from the Free State Department of Health, with Ethics Committee approval being granted by the University of the Free State.

All Level 1 and 2 hospitals in the Free State in which Caesarean sections (CSs) were, at that stage, being performed were visited in either May or June 2005. One Level 2 hospital (Pelonomi) in Bloemfontein was excluded, due to its being a training hospital for the University of the Free State Department of Anaesthesia and thus not representative of the human resources of the remaining hospitals.

The managers of the relevant hospitals were informed concerning the timing of the visit, and asked to notify their medical staff accordingly. At each hospital, the number of doctors administering obstetric anaesthesia was established and documented. The required number of questionnaires for the study was then given to the doctors present. After giving informed consent, they were invited to complete the questionnaires confidentially and to place them in a sealed envelope, which was returned in person to the investigator at the time of the visit.

The remaining questionnaires were given to absent doctors by a colleague as soon as possible. They were returned by mail in a sealed envelope.

Results

The medical personnel identified in this way as administering obstetric anaesthesia numbered 148. With the response rate standing at 69% (105/148) at least one questionnaire was returned from each of the 25 peripheral Level 1 and 2 hospitals. The response rate was 65% and 71% for Level 1 and 2 hospitals respectively. In six cases, the level of hospital could not be identified.

Rank of respondents and duration in post

The majority of respondents, comprising 50 in number, consisted of medical officers, while the remainder consisted of 26 community service doctors, 10 interns, 16 general practitioners (GPs) and 3 anaesthesia specialists. Overall, 45% had been at their present hospital for 12 months or less, with 23% being at their present hospital for more than 5 years.

Previous training and experience:

1. Internship

Most of the respondents had received limited training in anaesthesia as an intern, with 59% having received 4 weeks or less and 5% not having received any anaesthesia training as an intern. Thirteen doctors (12%) in all had not been exposed to obstetric anaesthesia as an intern. Though most had been supervised as Interns, such supervision, in 20.4% of the cases, had been conducted by junior medical officers. Four reported no supervision at all. However, community service doctors had all received anaesthetic training as an intern, though 87% of them had received training for 4 weeks or less.

2. Post internship, before present post

Some of the respondents had gained anaesthesia experience since internship (with 24% being unsupervised for more than a year, and 16% supervised for more than a year). Since internship, 32% of the doctors had had no anaesthesia experience, whether supervised or unsupervised and 14% had been supervised for 2 weeks or less. The doctors therefore based their current practice largely on the experience that they had gained as an Intern.

3. Obstetric anaesthesia experience.

While 17.8% of the doctors had not provided spinal anaesthesia for Caesarean section before their present post and 24% had not administered a general anaesthetic (Table I), closer inspection of the data revealed that 11% had neither administered spinal *nor* general anaesthesia during obstetric procedures before their present post. The doctors concerned included four who lacked a senior anaesthetist at the hospital where they worked. The respondents were all, at the time of the survey, administering obstetric anaesthesia.

Six doctors had only administered general, but not spinal, anaesthesia for CS – at the time of the survey, four were now also administering spinal anaesthesia. The two doctors who were still only administering general anaesthesia for CS were both experienced GPs, having been at their present rank and at their present hospitals for over five years each.

Twelve doctors had only administered spinal anaesthesia for CS before their present post, with, at the time of the study, five not yet having administered general anaesthesia for CS.

Postgraduate qualifications

One nonspecialist, a medical officer who had occupied the post for one to five years, had earned a Diploma in Anaesthesia.

Table I: Obstetric anaesthesia experience before present post

No of Caesarean sections	No of doctors having administered spinal anaesthesia for Caesarean section (%)	No and % of doctors having administered general anaesthetic for Caesarean section
0	18 (17.8)	24 (24)
1–10	20 (19.8)	30 (30)
11–50	32 (31.7)	23 (23)
51–100	16 (15.9)	8 (8)
> 100	15 (14.9)	15 (15)
No answer received	4	5

None of the 15 medical officers with more than five years' experience, nor of the 16 GPs, had earned the Diploma in Anaesthesia.

Nonanaesthesia qualifications had been obtained by 50% of doctors, with 43% of the doctors having passed courses in Advanced Cardiac Life Support, Advanced Trauma Life Support and/or Advanced Paediatric Life Support. Two doctors held the Diploma in Obstetrics, while one held a Diploma in Surgery. Three of the doctors concerned had successfully completed the Masters in Family Medicine degree. Of those long-term medical officers who had occupied their post for more than five years, 47% held no postgraduate qualification, nor did 37.5% of the GPs.

Other duties required while administering anaesthesia (Table II)

Only 3% of the doctors had not had to resuscitate a baby while administering anaesthesia for CS, and 12% had always to perform such a task when required to do so. One doctor had always both to perform the CS and to administer the anaesthesia. A further 11% had frequently to perform such a task and 22% infrequently.

Senior anaesthetic supervision

Of the respondents, 54%, including one intern who was employed by a hospital known to employ a senior anaesthetist, and 56% of the community service doctors, four of whom had only two weeks of anaesthesia experience as an Intern, noted that no senior anaesthetist was employed by the hospital at which they worked (Table III). Three other interns administered anaesthesia in the absence of a senior anaesthetist on the hospital

premises. Not one community service doctor had available the assistance of an on-site senior anaesthetist, although eleven could call for senior assistance from off-duty experts.

Suggestions made by the respondents

The respondents were asked to suggest how obstetric anaesthesia could be made safer in the hospitals in which they worked. Suggestions were made by 51% of respondents, the most common (52%) being that a senior anaesthetist should be employed by the hospitals concerned. One junior doctor recalled how he had lost a patient after high spinal anaesthesia without senior assistance.

Generally, improved training was requested, with 18.5% of the respondents requesting visits from members of academic institutions in order to obtain training in obstetric anaesthesia and 11.1% suggesting a rotation to institutions where medical officers could learn obstetric anaesthesia procedures before taking up posts in rural hospitals. Alternatively, the rotation of registrars from academic institutions to peripheral hospitals was also suggested by 3.7%. Three (5.6%) doctors emphasised the need for proven competency in *both* spinal and general anaesthesia for CS prior to being allowed to administer obstetric anaesthesia unsupervised. Two (3.7%) doctors expressed the desire to train for the Diploma in Anaesthesia, while 16.7% advocated improved anaesthesia equipment and drugs.

Other suggestions included the introduction of hospital resuscitation teams, increasing the training of interns in anaesthesia, the improvement of referral systems in higher level hospitals, and the availability of an extra doctor, who would be on call to help with CS and neonatal resuscitation.

Table II: Other duties that doctors are required to perform while administering anaesthesia for Caesarean section

Frequency	Resuscitation of baby (No)	Resuscitation of baby (%)	Performance of surgery (No)	Performance of surgery (%)
Never	3	2.9	70	66.7
Rarely (< 5%)	47	44.8	23	21.9
Frequently (6–9%)	42	40	11	10.5
Always (100%)	13	12.4	1	1.0

Table III: Senior anaesthetic supervision in present hospital post

Type of supervision	Number of doctors (%)	Number of interns (%)	Number of community service doctors (%)
Senior anaesthetist always in theatre complex	5 (4.9)	4 (50)	0
Senior anaesthetist on hospital premises – attends theatre when doctor <i>might</i> need him/her	3 (2.9)	0	0
Senior anaesthetist on hospital premises – attends theatre <i>only</i> when major emergency arises	2 (2.0)	0	0
Senior anaesthetist on call from home – attends theatre when doctor <i>might</i> experience a problem	19 (18.6)	2 (25)	6 (24)
Senior anaesthetist on call from home – only comes out when major emergency occurs <i>during</i> operation	13 (12.7)	1 (12.5)	5 (20)
No senior anaesthetist employed by hospital	55 (54.0)	1 (12.5)	14 (56)
Other	5 (4.9)		
No answer received	3	2	1

Discussion

The human resources survey described in the current article revealed three main problems:

1. The medical practitioners required to administer obstetric anaesthesia in the Free State are frequently inexperienced and unsupervised.
2. Long-term medical officers and GPs often lack adequate training and postgraduate qualifications in anaesthesiology.
3. Those doctors administering obstetric anaesthesia are often required to perform other tasks synchronously, thus compromising the safety of the mother.

1. Inexperience and lack of supervision

Some interns were found to be administering obstetric anaesthesia without supervision. Having the senior anaesthetist on call from home is inadequate for interns, since anaesthesia-related emergencies can happen unexpectedly and rapidly, and may result in death within a few minutes. The Health Professions Council of South Africa's (HPCSA's) guidelines for Intern training state that, for anaesthesia, "constant supervision of the intern is *critically important*", with such supervision ideally being that of a specialist, though, in the absence of such an expert, being that of a supervisor equipped with a Diploma in Anaesthesia.⁶

The study showed that, though community service doctors worked without direct supervision, their limited experience (see Results) suggested that they should be supervised when performing obstetric anaesthesia. While no specific regulations govern the supervision of Community Service doctors administering anaesthesia, it is the opinion of the Directorate of Workforce Management of the National Department of Health (personal communication) that such support and supervision is necessary.

2. Lack of training and postgraduate qualifications

Some of the respondents had not administered obstetric anaesthesia (or had only administered one type of obstetric anaesthetic) before being employed in a post in which they were expected to perform such a task.

In the UK it is recommended that junior anaesthetists undergo a "formal assessment" of competence in both regional and general anaesthesia before being allowed to administer obstetric anaesthesia with distant supervision, preventing any trainee from being allowed to work in a hospital which does not employ a consultant anaesthetist. Such assessment is recommended as taking place after about 20 supervised obstetric "sessions" have been experienced within a four-month period.⁷ A prerequisite for such training is that the trainee has already progressed to working with distant supervision in adult nonobstetric practice, in most cases over a period of several months. The Royal College of Anaesthetists (UK) recommends "at least 1 year's anaesthetic experience" before an anaesthetist is allowed to work without direct supervision in the field of obstetric anaesthesia.⁸

Such practice is in sharp contrast to that which is currently experienced in South Africa. The current South African intern training manual does not stipulate, as a requirement, the performance of a minimum number of obstetric anaesthetics, spinal or general, but only a minimum requirement of 40 general anaesthetics for any type of surgery.⁶

Regarding postgraduate qualifications in anaesthesia, none of the nonspecialist, long-term doctors providing anaesthesia in the Free State peripheral hospitals was found to hold the Diploma in Anaesthesia. The College of Medicine Diploma in Anaesthesia

(DA), which was instituted in South Africa in 1974, was intended to improve the standard of anaesthesia administered by GPs, serving as an ideal qualification for those doctors working in rural practice who are called upon to administer obstetric anaesthesia. In contrast to the findings of the current study, a survey conducted in 1999 to determine the role of the DA in South Africa found that 33% of GPs equipped with the DA worked in small towns or rural areas.⁹ All GPs and long-term medical officers administering obstetric anaesthesia should possess the DA.

3. Other duties required while administering obstetric anaesthesia

Vital to the practice of safe obstetric anaesthesia is both the quantity and the quality of human resources. Of major concern is the frequency with which respondents indicated that they were required to perform both anaesthesia and neonatal resuscitation on the same patient. An example of maternal death occurred in the Free State, in which case the diagnosis of high spinal anaesthesia was delayed, due to the anaesthetist having left the mother unsupervised in order to resuscitate the baby. The number of competent doctors in theatre should be sufficient to prevent the anaesthetist having to perform such emergency duties. In the absence of sufficient skilled and experienced human resources the need for maternal safety calls for smaller hospitals to merge their resources, where possible.

Strategies for reducing maternal deaths from anaesthesia

While the Saving Mothers Reports have all clearly recommended particular strategies for reducing maternal deaths from anaesthesia (Table IV), the problem has been the implementation of such strategies, as was predicted by the Minister of Health in the Introduction to the First Saving Mothers Report. Other than increasing the length of intern training in anaesthesia to two months, none of the other recommendations has been implemented in the Free State, so that the rate of maternal deaths directly from anaesthesia remains high in public hospitals (Table V). For example, in 2004 there were 12 deaths directly due to anaesthesia and 8 090 CSs,¹⁰ giving a death rate of 148.3/100 000 CSs – over 100 times greater than that for the UK. (However, one should be cautious in comparing figures from the UK with those in South Africa, as there are many more patients with significant comorbidity in the latter country).

Other African countries are also experiencing complications related to obstetric anaesthesia, to which solutions have yet to be found. A Nigerian teaching hospital has reported maternal deaths resulting from obstetric anaesthesia due to the inadequate supervision of trainees.¹¹ As relatively few specialists in anaesthesia were undergoing training in Nigeria when this article was written, the problem of supervision may remain for some time. The problems in the rural areas are so severe that reports hold that "ketamine anaesthesia by nonanaesthetists holds sway", having already resulted in deaths from acid aspiration, as well as leading to cerebrovascular accidents when administered to patients with pre-eclampsia.¹²

Distances from rural hospitals to referral centres tend to be even greater in Australia than in South Africa. Those doctors required to administer obstetric anaesthesia in the rural areas have benefited from a training programme focused on developing such skills.¹³

Conclusion

The recommendations made in the Saving Mothers Reports require urgent implementation in order to reduce the anaesthesia-

Table IV: Key recommendations regarding skills in obstetric anaesthesia from Saving Mothers Reports

1st Saving Mothers report, 1998	2nd Saving Mothers Report, 1999–2001 ²	3rd Saving Mothers Report, 2002 – 2004 ³
Training for staff in the use of regional anaesthesia	Acquisition of skills in both general and regional anaesthesia required for all doctors administering obstetric anaesthesia	Medical officers at Level 1 hospitals to have documented obstetric anaesthesia experience and training
Postgraduate training for all doctors administering obstetric anaesthesia	Rotation of specialist at regional level for the training of junior doctors	Minimum case list for interns
Conducting of a national human resources survey to determine the requirements for the above training	Longer training in anaesthesia for Interns	Outreach programmes for each province, each headed by senior academic in dedicated post
	Formal accredited resuscitation training	“Tool kit” (details of care and resuscitation) in obstetric anaesthesia for all Level 1 and 2 doctors

Table V: Type of anaesthesia associated with maternal deaths from anaesthesia, as well as level of hospital in the Free State (as reported to the Provincial Assessors for Maternal Deaths in the Free State).

Year	Total no of deaths	General anaesthetic (GA) deaths	Spinal anaesthetic deaths	Level 1		Level 2	
				Spinal	GA	Spinal	GA
1997	6	4	2	0	1	2	3
1998	4	2	2	1	0	1	2
1999	3	2	1	0	2	1	0
2000	9	8	1	1	6	0	2
2001	3	1	2	0	1	2	0
2002	5	5	0	0	4	0	1
2003	3	1	2	1	1	1	0
2004	12	3	9	6	3	3	0

Note: No anaesthetic-related maternal death occurred at Level 3.

related maternal mortality rates as soon as possible. Denominator data should be collected in order to establish the case fatality rates for both regional and general anaesthesia. The exact contributory causes of maternal mortality due to anaesthesia should be established by way of the Confidential Enquiries into Maternal Deaths in South Africa. In the interim, the current study describes the extent of the deficiency of training, experience and support for doctors administering obstetric anaesthesia in the Free State, suggesting the considerable inadequacies that require urgent addressing.

SAJAA

References

- Pattinson RC, ed. Saving Mothers. Report on Confidential Enquiries into Maternal Deaths in South Africa, 1998. Pretoria: Department of Health, 1998.
- Pattinson RC, ed. Saving Mothers. Second Report on Confidential Enquiries into Maternal Deaths in South Africa, 1999–2001. Pretoria: Department of Health, 2003.
- Pattinson RC, ed. Saving Mothers. Third Report on Confidential Enquiries into Maternal Deaths in South Africa 2002–2004. Pretoria: Department of Health, 2006.
- Lamacraft G, Hollingworth S, Dowie JG, Schmidt MJ, Diedericks BJS, Joubert G. A survey on the use of regional anaesthesia for caesarean sections in level 1 and 2 hospitals in the Free State. *S Afr Med J* 2004; 94(9): 762-763.
- Lamacraft G, Schmidt MJ, Diedericks BJS, Joubert G. An audit of the use of regional anaesthesia for Caesarean section in the Free State: from 2002 to 2004. *Southern African Journal of Anaesthesia and Analgesia* 2007; 13(4): 21-26.
- Health Professions Council of South Africa. Handbook on Internship Training. Guidelines for Interns, Accredited Facilities and Health Authorities. Pretoria 2004/5.
- Obstetric Anaesthetists' Association. Assessment of Trainees in Obstetric Anaesthesia. OAA, 2005: <http://www.oaa-anaes.ac.uk/publications.htm>
- Kinsella SM, Walton B. Adequacy of Staffing. Chapter 8.1 Obstetric Services. In: *Raising the Standard: A Compendium of Audit Recipes*, 2nd Edition. London: Royal College of Anaesthetists, 2006.
- Gordon PC, James FM. The Role of the College of Medicine of South Africa Diploma in Anaesthesia in Southern Africa. *S Afr Med J* 1999; 89:416-8.
- Hospital Statistics Database: <http://www.fshealth.gov.za>
- Enohumah KO, Imarengiaye CO. Factors Associated with Anaesthesia-Related Maternal Mortality in a Tertiary Hospital in Nigeria. *Acta Anaesthesiol Scand* 2006; 50:206-10.
- Okafor UV. Evolution of Obstetric Anaesthesia in West Africa: Current Trends. *Int J Obs Anaesth* 2006;15:176-7.
- Davie MJ. General Practitioner Survey 2006. *Anaesth Intensive Care* 2006;34(6):770-5.