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Saving lives by task sharing: The role of the non-doctor surgeon

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Abstract

Background:

Ethiopia has serious shortages of obstetric and surgical specialists. A national Masters degree programme to train non-doctor mid-level health professionals in Emergency Surgery and Obstetrics started in 2009. Qualified professionals are known as integrated emergency surgical officers (IESOs).

Aims:

This study was carried out to evaluate graduated IESO's performances and the outcome of their work.

Methods:

Questionnaires were sent to all 135 registered members of the Professional Association of Emergency Surgical Officers of Ethiopia (PAESOE). Responses were received from 64 IESOs.

Findings:

Results showed that the IESOs had carried out a total of 20 176 caesarean sections since graduating. In the first 3 months of 2016, there were 3035 caesarean sections and 970 other laparotomies. Following caesarean section, the rate of neonatal deaths was 2.8%, and the rate

of maternal deaths was 0.26%. The rate of maternal deaths following laparotomies was 0.61%. The rate of postoperative complications was 1.92%.

Conclusions:

Results showed that task-sharing with trained non-doctor emergency surgeons can improve access and outcomes for patients in need of essential surgical care. A similar programme could be a model for other developing countries.

Surgical care provision in the rural hospital setting in low- and middle-income countries, including in Ethiopia, is hindered by a paucity of trained workers, and inadequacies in basic infrastructure (**Raykar et al, 2015**). Ethiopia has been experiencing serious shortage of gynaecologists and surgeons for several decades (**Berhan, 2008**). In Ethiopia, the population density of specialists is 0.6 per 100 000 people; obstetricians make up 0.2 per 100 000 people, and surgeons 0.4 (**Holmer et al, 2015**). High national maternal and perinatal mortality in the country was shown in the world health statistics 2015 of the **World Health Organization (WHO) (2015)**, especially in the most common obstetric emergencies (**Berhan and Berhan, 2014**; **Rose et al, 2015**).

Shortages in trained health professionals have also contributed to poor outcomes in cases of acute abdominal emergencies and trauma. **Rose et al (2015)** estimated total surgical need (obstetric and other general surgical procedures) in eastern sub-Saharan Africa, based on prevalence of disease and population, to be 6145 procedures per 100 000 people. The number of surgical procedures in 2011 in the Southern regional state of Ethiopia varied from 56 to 421 operations per year per 100 000 people; 36% were major surgical operations and 58% were caesarean sections (**Reshamwalla et al, 2012**). In 2008, the caesarean section rate in 797 facilities in Ethiopia was only 0.6% (ranging from 0.2% to 9%) (**Fesseha et al, 2011**). A literature review by **Berhan and Berhan (2014)** examined 30 years of data from Ethiopia and found that the leading cause of maternal mortality was obstructed labour with or without uterine rupture—which could have been prevented by timely caesarean section.

Shifting tasks, such as caesarean sections and other emergency surgical procedures, to non-doctor surgeons to address the lack of medically qualified specialists in the country has shown no significant differences in quality and outcome in Mozambique, Malawi and Tanzania (**McCord et al, 2009**).

To improve access to surgery for emergency caesarean section as well as other obstetric and surgical procedures in the country, the Ethiopian Ministry of Health, in collaboration with universities and development partners, began an initiative to train non-doctor, mid-level health professionals in emergency obstetrics and general surgery. This innovative national programme, the first of its kind in the world, trains mid-level health workers to Masters degree level and was launched in January 2009, initially in three universities. Qualified health officers and Bachelors degree nurses working in health facilities for minimum of 2 years are recruited through a tough entrance examination.

Successful candidates are then trained in a 3-year Masters programme designed to produce integrated emergency surgical officers (IESOs), competent to perform emergency surgical, gynaecological and obstetrics operations. The first batch of graduates qualified in 2012/13. In

early 2016, there were 884 IESOs in the country (529 graduates and 355 under training). The aim is to train one IESO per 100 000 people.

The purpose of this study was to capture the performances and outcomes of IESOs in the country.

Methods

A cross sectional survey was conducted by involving IESOs who were in service for variable period since their graduation. Structured questionnaire forms were sent by email to all 135 registered members of the Professional Association of Emergency Surgical Officers of Ethiopia (PAESOE) by the third and fourth authors (President and steering committee member respectively of PAESOE) in the middle of April 2016 and collected in May 2016. For this anonymous study of performance review ethical approval was not considered necessary. This anonymous and voluntary evaluation form asked about their age, sex, and year of qualification as IESO. They were asked about the type of hospital they were working in and if there were any medically qualified surgeons or obstetricians in their hospitals. They were asked about the total number of caesarean sections they had carried out since qualification, and how many caesarean section and laparotomies they had done in the months of January, February and March of 2016. They were also asked to fill in the number of neonatal and maternal deaths following caesarean sections, the number of deaths following laparotomies, and any major complications after caesarean section and laparotomies that resulted in hospital stay longer than one week. Respondents were asked if there were regular reviews of postoperative deaths and complications in their hospitals. Questions were asked about difficulties in carrying out their job, including a lack of experienced anaesthetic support and/or blood transfusions, and conflicts with the medical colleagues, if applicable. Respondents were asked to fill the area which gave them the best job satisfaction. Finally, they were asked about their major concern in their jobs, including training received in carrying out their job, career and sustainability.

Results

A total of 64 IESOs responded (59 male and 5 female), with an average age of 32.4 years (range 27–43 years). Among the respondent IESOs, 9 had qualified in 2012; 14 in 2013; 18 in 2014; 22 in 2015 and 1 in the first 3 months of 2016 (*Table 1*). In total, the ISEOs had worked for 1198 months. The results showed that 44 of the respondents worked in primary hospitals (68.75%), 17 in zonal or general hospitals (26.56%) and 3 in referral hospitals. Medically qualified surgeons and/or obstetricians worked with IESOs in all of the 3 referral hospitals, 12 of the 17 general hospitals (70.58%) and 10 of the 44 primary hospitals (22.72%) (*Table 2*).

Table 1. Respondent demographics

Demographic	***n***	**Average**

Gender		
Male	**59**	
Female	**5**	
Age (years)		
25–29	**14**	
30–39	**46**	**32.43**
40–45	**4**	
Year of qualification		
2012	**9**	
2013	**14**	
2014	**18**	
2015	**22**	
2016	**1**	

Table 2. Respondents' place of work

Type of hospital	Primary (*n*=44)	Zonal/general (*n*=17)	Referral (*n*=3)
ISEO working alone (without doctors)	**34**	**5**	**0**
ISEO plus medically qualified surgeon/obsetetrician	**10**	**12**	**3**

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Since qualifiying, the 64 IESOs had carried out 20 176 caesarean sections between them, with 3035 in the first 3 months of 2016. During this period, 85 neonatal deaths (2.8%) and 8 maternal deaths (0.26%) were recorded. Of the 8 maternal deaths, only 3 were specified as patients with eclampsia, and the other 5 were unspecified. None of the 85 neonatal deaths were further specified. The IESOs had also performed 970 general surgical and obstetric laparotomies in those 3 months, with 6 in hospital deaths (0.61%). Of these, two followed penetrating multiple visceral injury, three followed septic shock after bowel gangrene and perforation and one was due to unspecified causes.

There were a total of 79 (1.92%) major complications that resulted in a hospital stay more than 1 week after caesarean section and laparotomies, including 36 surgical site infections, 4 wound dehiscence, 3 hospital-acquired pneumonia, 1 obstetric fistula and 35 unspecified complications

(*Table 3*).

Table 3. Mortality and morbidity after surgery

	n	%
Caesarean section		
Total	**3035**	**100**
Maternal deaths	**8**	**0.26**

Neonatal deaths	**85**	**2.8**
Obstetric and non-surgical laparotomies		
Total	**970**	**100**
Maternal deaths	**6**	**0.61**
Major complications (caesarean section and laparotomy)		
Total	**79**	**100**

All of the hospitals held regular mortality and morbidity reviews. When asked responding to suggestions of possible major constraints in carrying out their jobs, 44 IESOs agreed with a lack of available adequate blood transfusion (68.75%) and 5 (7.8%) agreed that there was a lack of experienced anaesthetic cover support. All of the anaesthetists were qualified nurse anaesthetists. In 25 hospitals where medically qualified persons carried out surgical procedures alongside the IESOs, 5 ISEOs reported occasional conflicts. All of the IESOs agreed that their jobs were satisfying due to comments from their patients and their relatives as well as from the health authority. One comment said:

'Patient satisfaction and good encouragement from the community is really great reward and keeps me providing the service despite many challenges.'

All of the IESOs, however, expressed major concerns regarding their career prospects and the sustainability of their job, and two even mentioned that they were considering switching to medicine, thereby initiating further study, because of this. All of the IESOs were keen to have further training in various aspects of emergency surgery (*Table 4*).

Table 4. Respondent constraints and concerns (*n*=64)

Constraint/concern		***n***	**%**
Regular mortality and morbidity review	**Yes**	**64**	**100**
	No	**0**	**0**
Major constraints in job	**Lack of available adequate blood transfusion**	**44**	**68.8**
	Lack of experienced anaesthetic cover	**5**	**7.8**

	Occasional conflicts with medically qualified staff	**5**	**20**
Satisfied with job	**Yes**	**64**	**100**
	No	**0**	**0**
Major concerns	**Career prospects**	**64**	**100**
	Sustainability of job	**64**	**100**
Further training wanted	**Yes**	**64**	**100**
	No	**0**	**0**

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Discussion

The burden of untreated surgical conditions falls heaviest on individuals living in low- and middle-income countries. **Bickler et al (2015)** estimated that 16.9 million lives were lost from conditions needing surgical care. Countries with fewer than 20 specialist surgeons, anaesthetists, and obstetricians per 100 000 people have worse health outcomes, and a scaling up of the workforce to this level is recommended (**Meara, 2015**). In a survey of total 174 countries, surgical task shifting occurred in 33% and anaesthetic task shifting in 65% countries (**Federspiel et al, 2015**). The outcomes of major obstetric and general surgical procedures carried out by trained non-doctor surgeons in other countries have been similar to those of medically qualified doctor surgeons (**McCord, 2009**). In this study, IESOs carried out an average of 189 caesarean sections and 60 laparotomies per year. The number of perioperative deaths and complications in the study was comparable to medically qualified obstetric teams elsewhere (**Ugwu, 2011**, **Bhangu, 2016**). **Molina et al (2015)** have shown that increasing caesarean delivery in countries with low caesarean section rates can avert thousands of maternal and neonatal deaths. Without these procedures being done by the IESOs in the last few years, many mothers, neonates and adults in Ethiopia would have otherwise died or have suffered severe serious consequences. This is probably more so in remote areas of the country where there are often no medically qualified surgeons or obstetricians at all. However, the issue of adequate infrastructure, including timely blood transfusion service, experienced anaesthetic cover and support from medical colleagues, needs to improve for non-doctor surgeons to be more effective. Generally, all of the IESOs in this study were satisfied with their jobs, but raised concerns about further emergency training needs as well as career security and development, which must be addressed.

A limitation of the study is the number of responses, although this is not surprising considering that most of the IESOs work in isolated rural locations with poor access to the internet. As a result, the total number of responses reflects approximately a tenth of the working IESOs in the country. Additionally, this study was not prospective but as this

captures the 64 respondent IESOs' most recent activities, it provides reasonable evaluation of their activities and outcome.

Conclusion

Task sharing in Ethiopia by the introduction of trained non-doctor surgeons is resulting in improved access to essential surgery in rural facilities with better outcome for the population at large.

Key Points

- Trained non-doctor surgeons are already making a huge difference in providing essential surgery for obstetrics and surgery, saving tens of thousands of maternal and newborn lives in Ethiopia
- This study set out to survey Integrated Emergency Surgical Officers (IESOs) in Ethiopia to assess their performance
- Their role in providing essential surgery to the population needs to be properly recognised and their continuous professional development needs should be addressed regularly
- Countries needing to scale up the surgical workforce should consider adopting proven training models such as the Masters degree programme described in this study.

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