

The Impact of Anaesthetic Assistants on Anaesthesia Service in Sudan

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Abstract

History of the establishment of the School of Anaesthetic Assistants (SAA) in Sudan was mentioned in details where it was clear that in the late fifties and early sixties surgical services were expanding without similar expansion in anaesthetic services due to lack of interest from doctors in anaesthesia. This is taken as a prototype to what is happening in most African Countries (Akinyemi & Soyannwo 1980).

The effort of the pioneers to overcome this problem was tremendous; they managed to solve the problem, though on a lower profile, by the establishment of the SAA, while their effort to gain more doctors to the specialty continued.

The lack of job description for the anaesthetic assistants was clear.

The curriculum of the school was updated. But the shortage of trainers was obvious.

The study done in Soba University Hospital (SUH), Khartoum Teaching Hospital (KTH) & and some States hospitals showed clearly that the best anaesthetic outcome was obtained where both physician anaesthetist and anaesthetic assistant work together. The mortality rates were higher with the assistants working unsupervised, while morbidity was higher with the physician anaesthetists and this is due to their ability to recognize and manage complications more than the assistants.

The study recommends that a clear job description for the assistants should be put forward. More effort should be spent to attract more doctors to the specialty. More care should be paid to the proper documentation for anaesthetic events in the patient record sheets.

ABBREVIATIONS

SAA (school of anaesthesia assistant) KTH (Khartoum Teaching Hospital) SUH (Soba University Hospital) AA (anaesthesia assistant)

INTRODUCTION

History of the establishment of the School of Anaesthetic Assistants (SAA) in Sudan was mentioned in details where it was clear that in the late fifties and early sixties surgical services were expanding without similar expansion in anaesthetic services due to lack of interest from doctors in anaesthesia. This may be due to the lack of doctors in the country as a whole. Amina (1995) stated that from 1898 till independence in 1955 the number of Sudanese doctors was only 150. At that time the intake of students to the medical school was every two years and the number did not exceed twelve student at most. The first registrars of anaesthesia were taken in April 1958. There was no proper training locally and they depended on self-learning till they left to United Kingdom to get their degrees. Those were Professor Eltahir Fadl Mahmoud and Dr. Abdel Ghani Farah (prof

Eltahir F. 2001, pers. Comm., 3 April).

METHODOLOGY

A) Study site: This study was conducted at

I) School of Anaesthetic assistants, Khartoum Teaching Hospital.

II) Soba University Hospital (SUH)

III) Khartoum Teaching Hospital (KTH)

IV) Five hospitals from the States, namely Port Sudan, Kassala, Gadarif, El Rahad and Medani.

B) The history of the SAA was taken by different means

i) From records of the School.

ii) Senior graduates of the School.

iii) Pioneers who started the School.

iv) the current Dean of the School.

v) Individual Anaesthetists.

C) The Selected hospitals were studied by the following means:

i) Visits and appropriate data collection.

ii) For KTH and SUH the study included a retrospective and prospective periods.

SUH: Retrospective period: from Jan 98 to March 99 and from June 2000 to Dec 2000. Prospective period: from April 99 to Dec 99 and from January 2001 to June 2001.

KTH: Retrospective period: From Jan 99 – April 2000.

Prospective period: from May 2000 to Dec 2000 and from July 2001 to Oct 2001.

Data collected included number of anaesthetics done, who conducted the anaesthesia,

Hospitals in the States: data collected was mainly retrospective; from records when available or from assistants and surgeons working in these hospitals (Mohamed A 2000, Babiker A 2000, Abdalla A 2000, Mohamed E 2001, Eshag 2001, Yousif E 2001, Enour H 2001 pers. Cumm).

Obtain recorded information from SUH, KTH and provinces as regards:-

1. Number of patients and type of anaesthesia administered.
2. Outcome and complication recorded.
3. Number and type of anaesthetic personnel in Sudan general and in selected hospitals specially.
4. Satisfaction and evaluation of surgeons and obstetricians throw designed questioner from anaesthesia service.
5. Designed questioner to the directors of hospitals (5) hospitals were selected to know size of service provided by (AA) in these hospitals.
6. Study design:-

The study utilized the comparative research design between:

1. SUH as supervised hospital; all ceases are done under physician anesthetist supervision.

2. KTH as mixed hospital where both supervised and unsupervised anesthesia is done.

3. Provinces as unsupervised; no physician anesthetists.

DATA ANALYSIS

F. Using a master sheet and E P 16 computerized programme for qualitative and figure workout for hypothesis testing X2 and 0.05 probability level was predetermined as the level of significance.

RESULTS

Since 1966 the SAA graduated 863 anaesthetic assistants of whom only 371 are in service now according to the last report from Health Information Center – Federal Ministry of Health 2000, and their distribution as follows

Figure 1

Location	Number
Federal Ministry of Health	127
Khartoum city	47
Elgazera	24
Weight Nile State	11
Blue Nile State	4
Sinnar State	8
North State	5
Kassala State	11
Gadarif State	21
Read See State	14
N. Kurdufan State	18
S. Kurdufan State	18
W. Kurdufan State	11
N. Darfour State	2
S. Kurdufan State	9
W. Kurdufan State	15
Bahar Elgazal State	3
Nile State	20
Bahar Elgabal State	3
Total	371

The hospitals included in this study were

- Soba University Hospital (SUH) where anaesthesia service is provided by physician anaesthetist or supervised assistant anaesthetist. The total number of patients done where 5040 patients during the period of the study. There were 9 morbidities and 2 mortalities.
- Khartoum Teaching Hospital were anaesthetic service is carried by physician anaesthetist or under his supervision in 40% of cases and by unsupervised assistant anaesthetist in 60% of cases. Total number of cases done is 39,044. There were 7 morbidities and 29 mortalities.
- Hospitals from the States: this included (Port

Sudan Hospital, Kassala Hospital, Gadarif Hospital, Madani Hospital) where anaesthetic service is carried by unsupervised anaesthetic assistants. In most hospitals there were neither proper records of cases done nor anaesthetic records in patients' folders during the designated period of this study. The estimated figure was 11,750 of anaesthetics done in all four hospitals; this figure and the estimated mortality of 27 patients were taken by personal communication from surgeons and anaesthetic assistants at these hospitals; no clear history of morbidity could be accounted for.

TABULATED RESULTS

The following tables and figures show the results obtained during the study:

Figure 2

Table 1: showing the total number of morbidity and mortality according to the hospital (SUH all anaesthetics are supervised, KTH only 40% supervision) P value 0.0005)

	Morbidity	Mortality	Total
SUH	9 (81.8%)	2 (18.2%)	11 (100%)
KTH	7 (19.4%)	29 (80.6%)	36 (100%)
TOTAL	16 (34.05%)	31 (65.95%)	47 (100%)

Figure 3

Table 2: showing the total number of morbidity and mortality (KTH & SUH) according to the anaesthesia provider (P Value 0.0001)

	Morbidity	Mortality	Total
Anaesthetists	9 (19.15%)	1 (2.13%)	10 (21.28%)
Assistants	7 (14.89%)	30 (63.83%)	37 (78.72%)
Total	16 (34.04%)	31 (65.96%)	47 (100%)

Figure 4

Table 3: Show morbidity & mortality related to hypoxemia and the percentage of cases related to the anaesthesia provider (P value 0.03)

	Anaesthetist	Assistant	Total
Hypoxemia	1 (2.12%)	20 (42.56%)	21 (44.68%)
No Hypoxemia	9 (19.15%)	17 (36.17%)	26 (55.32%)
Total	10 (21.27%)	37 (78.72%)	47 (100%)

Figure 5

Table 4: Show morbidity & mortality related to cardiac arrest and the percentage of cases related to the anaesthesia provider (P value 0.0000004)

	Anaesthetist	Assistant	Total
Arrest	2 (4.26%)	36 (76.59%)	38 (80.85%)
No arrest	8 (17.02%)	1 (2.13%)	9 (19.15%)
Total	10 (21.27%)	37 (78.72%)	47 (100%)

Figure 6

Table 5: Show morbidity & mortality related to wrong intubations and the percentage of cases related to the anaesthesia provider. NB All wrong intubations occurred during emergency surgeries and by assistants.

	Anaesthetist	Assistant	Total
Wrong Intubation	0 (0%)	10 (21.28%)	10 (21.28%)
Proper Intubation	10 (21.28%)	27 (57.44%)	37 (78.72%)
Total	10 (21.28%)	37 (78.72%)	47 (100%)

Figure 7

Table 6: Show morbidity & mortality related to inadequate crises management (ICM) and the percentage of cases related to the anaesthesia provider.(P value 0.0002)

	Anaesthetist	Assistant	Total
ICM	0 (0%)	27 (57.44%)	27 (57.44%)
Adeq CM	10 (21.28%)	10 (21.28%)	20 (42.56%)
Total	10 (21.28%)	37 (78.72%)	47 (100%)

Figure 8

Table 7: Shows morbidity & mortality due to cardiac arrest related to state of surgeries i.e. Emergency or Elective. (P value 0.0005)

	EM	EL	TOTAL
Cardiac Arrest	30 (63.83%)	8 (17.02%)	38 (80.85%)
No Cardiac Arrest	1 (2.13%)	8 (17.02%)	9 (19.15%)
TOTAL	31 (66.0%)	16 (34.0%)	47 (100%)

Figure 9

Table 8: Show Morbidity and mortality according to type of surgery and anaesthesia provider.

	Emergency	Elective	Total
Anaesthetists	0 (0%)	10 (21.28%)	10 (21.28%)
Assistants	33 (70.21%)	4 (8.51%)	37 (78.72%)
Total	33 (70.21%)	14 (29.79%)	47 (100%)

Figure 10

Table 9: Morbidity and Mortality per 10,000 anaesthetics at the three different categories of hospitals.

	Morbidity per 10,000 anaesthetics	Mortality per 10,000 anaesthetics
KTH	2	8
SLH	18	2
States	--	23

DISCUSSION

This study was conducted in three different categories of hospitals where we found many difficulties on obtaining

proper data especially in the states where most of the data was based on personal communication.

Inclusion criteria: data collection was done according to specific criteria; any data not supported with records or there was debate on the same case between the surgical team and the anaesthesia team was not accepted.

In spite of the fact that the SAA was established over thirty years ago, no effort was made to assess the performance of the graduates of this school in a serious way. Part of this study was directed to this goal.

The study looked at the impact of the anaesthetic assistants on the anaesthesia outcome in three different categories of hospitals; SUH where all anaesthetics are done under supervision, KTH where supervised anaesthesia is only 40% of cases and hospitals from the states where anaesthesia is 100% unsupervised.

In SUH 5040 cases were done during the study period, of these there were 9 morbidities (81.8% of the total morbidity and mortality at SUH) and 2 mortalities (18.2%), (Tab 1), This makes a morbidity rate of (18 per 10,000) and a mortality of (2 per 10,000) of all cases done in SUH. Of the two mortalities one is done by an assistant unsupervised. The morbidity was high due to the fact that most of the cases referred to SUH were complicated and high risk patients.

In KTH 39,044 cases were done during the study period, of these there were 7 morbidities (19.4% of the total morbidities and mortalities at KTH) and 29 mortalities (80.6%). This makes a morbidity rate of (2 per 10,000) and a mortality rate of (8 per 10,000) of all cases done in KTH. The morbidity was low in KTH due to failure of crisis management leading to higher mortality rate.

Looking at table 2, of the total 16 morbidities occurring at both SUH and KTH, 9 cases (56.25%) occurred with physician anaesthetist or under his supervision and 7 cases (43.75%) occurred with unsupervised assistants; and of the total 31 mortalities one case (3.22%) occurred with a physician anaesthetist and 30 cases (96.78%) occurred with unsupervised assistants. If the total morbidities and mortalities are taken for each category of anaesthesia provider, for the supervised group it was 21.27% and for the unsupervised group it was 78.73%.

When the causes of morbidity and mortality was broken down with relation to the anaesthesia provider, it was found that with hypoxemia 95.2% of cases occurred with assistants

and only 4.8% of cases occurred with physician anaesthetists (Table 3), which was statistically significant, P value 0.003.

For cases of cardiac arrest 94.7% occurred with assistants and 5.3% occurred with physician anaesthetists (Table 4), which was significant with P value 0.004.

Of the wrong intubated cases 100% occurred with the assistants, (Table 5).

Looking at the inadequate crisis management, 100% of cases occurred with the assistant anaesthetists, (Table 6). This explains the high morbidity mentioned above at SUH where crisis management was done or supervised by a physician anaesthetist leading to less mortality.

When cardiac arrest was related to type of surgery, 30 cases occurred during emergency surgery and only 8 during elective surgery (Table 7).

It was recognized that all morbidities and mortalities during emergency surgery occurred with the assistants (Table 8).

As the surgical procedures became more and more complicated the assistants are in more need for assistance and support from doctors.

Assistants can provide services for patients who are well and fit with good outcome, but it was clear that they have problems with patients under going emergency surgery (specially obstetric patients undergoing emergency C/S) the outcome is compromised.

The graduates of this school can administer anaesthetics properly with good skill, but they are very poor when it comes to handling complications occurring during anaesthesia. This is demonstrated clearly by looking at table 1. The mortality rate in SUH is so minimal and the two patients shown in the table one of them was done by unsupervised assistant. The mortality rate under direct supervision of anaesthetist will be 1:5040, i.e. 2 per 10,000 anaesthetics in SUH if we compare this by KTH which is 40% supervised we found that 28,992 patients out of 39,044 were done by assistants and the number of mortalities as shown in table 1 was 29 in KTH, i.e. approximately 8 per 10,000 anaesthetics. The third category of hospitals (States) where anaesthetics were totally unsupervised, the mortality rate was high. The number of patients done during the period of the study was approximately 11,750, the mortality was 27, i.e. about 23 deaths per 10,000 anaesthetics, and no morbidity could be accounted for due to absent

documentation in the patients' record or even in the registration book, Table (9).

From Figure (2) lack of knowledge represents 74.5% of all case included in this study. Inadequate crisis management represented 78.7% of all factors; other factors were failure to check, wrong choice, inattention or carelessness inadequate preparation and overdose.

Assistants who are certified to provide anaesthesia were so deficient in their knowledge because there were no text books specially for them and no refresher courses or in service training to make them update in their knowledge, especially those who work unsupervised by physician anaesthetists (in the provinces); many attempts were made by the SAA administration to convince local authorities to adopt a program designed by the School for refreshing and upgrading the assistants at the School but there was no response, (Personal communications).

CONCLUSION

The conditions that led to the establishment of the School of Anaesthetic Assistants were logical at that time and to a great extent still are today.

The shortage in physician anaesthetist was and still is great till today; it is difficult to provide supervised anaesthetic services except to major teaching hospitals. There are no clear standards or specific job description specifying the do and don't for the anesthetic assistants.

There is an increased rate of mortality and morbidity when anaesthesia is administered unsupervised.

The condition was even worse in hospitals where there was no physician anaesthetist, due largely to the ignorance of most doctors about the art of anaesthesia.

The need for the SAA will remain for a long time to come, but the need to put forward measures that would increase the number of physician anaesthetists can not be over stressed.

Documentation for anaesthetic events was lacking in all State hospitals visited and inadequate in many teaching hospitals.

There were no refresher courses or in-service training what so ever for the assistants after they graduate from the School, and many of them working in remote areas with very poor facilities or proper medical cover.

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