Evaluation of Performance of Anesthesia Assistants of Nepal

Submitted to:
Nepal Safer Motherhood Project

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i. Acronyms and Abbreviations

AA	-	Anesthesia Assistant
AAT	-	Anesthesia Assistant Training
AHW	-	Auxiliary Health care provider
ANM	-	Auxiliary Nurse Midwife
BEOC	-	Basic Emergency Obstetric Care
CEOC	-	Comprehensive Emergency Obstetric Care
CSF	-	Cerebrospinal Fluid
DFID	-	Department for International Development
DOHS	-	Department of Health Services
FHD	-	Family Health Division
GA	-	General Anesthesia
HA	-	Health Assistant
HMCM	-	Hospital Management Committee Member
INF	-	International Nepal Fellowship
IV	-	Intra-venous
IVA	-	Intra-venous Anesthesia
LSCS	-	Lower Segment Cesarean Section
MDGP	-	Doctorate in Medicine in General Practice
MOH	-	Ministry of Health
NHTC	-	National Health Training Centre
NSMP	-	Nepal Safer Motherhood Project
OT	-	Operation Theater
PA	-	Physician Anesthetist
SN	-	Staff Nurse
WHO	-	World Health Organization

ii. Preface

The National Safe Motherhood Policy of the Ministry of Health envisages the provision of CEOC services in all peripheral hospitals of the country. This means the availability of 24-hour emergency services including surgery. The importance of proper anesthesia administration during surgeries cannot be overstressed. Realizing the importance of anesthesia services, the Ministry of Health, in partnership with the World Health Organization initiated a three month Anesthesia Assistant training in Bir Hospital in 1996. The Family Health Division conducted a follow up on the training with a few trainees and received enough feedback suggesting that the curriculum needed to be revised.

In partnership with Nepal Safer Motherhood Project, the Family Health Division piloted a competency based 6 months training curriculum in three districts. This work was led by Dr. Paul Foster of the International Nepal Fellowship as part of their Health Services Partnership Project, who developed the course and conducted most of the training. The initial curriculum was revised after the pilot test, and developed into the Competency Based Training Course for Anesthesia Assistants in Nepal. The curriculum has been endorsed by the National Health Training Center. The training program is currently being conducted in Patan Hospital and Tansen Hospital.

This study attempts to evaluate the six months anesthesia assistant training curriculum, the trainees' perception and suggestions for future improvement, the knowledge and competence level of the Anesthesia Assistants, the anesthesia services being provided and the perceptions of the doctors working with Anesthesia Assistants, the peers of Anesthesia Assistants and the Hospital Management Committee Members. The study attempts to explore some of the related issues on the Anesthesia Assistant training, the services of Anesthesia Assistants, and the impact of Anesthesia Assistants services on the overall services of the hospital.

The study was designed jointly by Mr. Ashish OM Sitoula, Dr. Charles Collins, Dr. Samson Retnaraj, Dr. Pius Raj Mishra and Dr. C. A. K. Yesudian. The clinical evaluation tools were based on the Training Guides developed by Dr Paul Foster.

The study team would like to thank all the respondents of the study for availing their valuable time in replying to the queries and in supplying the required information that has made this evaluation possible. Special thanks are due to the Medical Superintendents of the all hospitals evaluated, for facilitating the data collection process. Likewise, sincere appreciation is extended to the following for their guidance in shaping the study: Dr. Yeshobardhan Pradhan, Dr. Ganga Shakya and Dr. Bimala Lakhey, FHD; Dr. Baburam Marasini, NHTC; Dr. Vijaya Manandhar, WHO; Dr. B. D. Jha and Dr. Resham Rana, Bir Hospital; and Dr. Maurice Lee, INF.

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v. Executive Summary

In 1996, a three-month anesthesia assistant course was launched with financial support from World Health Organization. The Department of Anesthesia of Bir Hospital was selected as a training site, and in four years, and approximately 50 Anesthesia Assistants were trained. A follow up was conducted which revealed that the Anesthesia Assistants were very helpful in providing surgical services but the course needed to be revised to include more content on anesthesia management. Thus, the Family Health Division and the National Health Training Center created a new competency based six-month anesthesia assistant course, which was piloted in Western Regional Hospital, Pokhara and the trainees were evaluated later. Based on the findings of the evaluation, the training curriculum was revised and endorsed. Patan Hospital, which is responsible for managing this course, has so far trained 24 Anesthesia Assistants (AAs).

1. Objectives of the Study

Overall Objectives:

1. Assessment of the Anesthesia Assistant course – an assessment of the trainees' experience, inputs into the training, etc.
2. Assessment of the skills and knowledge of the Anesthesia Assistant – an assessment of the output of the training
3. Assessment of the impact of the Anesthesia Assistant on Safe Motherhood service delivery – an assessment of the outcome of the training. For e.g., reduction in referrals, percentage of increase in cesarean section deliveries, reduction in incidences of deaths, etc.

2. Methodology

The study was conducted through the use of both quantitative and qualitative methods using on-site observations, self-administered tests, and, interviews with health service providers, and Hospital Management Committee Members, both formally and informally. A literature review of national and international documents related to non-physician Anesthesia Assistants was conducted prior to the data collection to provide input on the design of the study. Altogether data and information has been collected from 68 health service providers of different levels from 17 hospitals and 3 primary health care centers around the country.

Simple descriptive statistical tools like frequency and percentage was used to analyze the data. The findings have been analyzed and presented in the study using both quantitative and qualitative measures as have been applicable.

3. Findings

The findings of this study primarily portrays the services being provided by the Anesthesia Assistants trained in the competency based six months training course. The N for knowledge of the AAs is 13 while for the rest N is 11, unless specified otherwise. References to the three months trained AAs (N=9) are made only in areas, where it is appropriate. Overall a total of 22 AAs, combining the 3-month trained and the 6-month trained, were included in this study.

The AAs (N=22) are relatively young with the youngest being 21 years of age while the oldest is 47 years old.. While 14 (63.6%) AAs are male, the rest 8 (36.4%) female. Nine (40.91%) have received 3 months AA training; the remaining 13 (59.09%) have received 6 months AA training. The average years of service of AAs is 15 years. The designations of AAs seem to be uniformly distributed. While over one fourth (27.27%) of AAs are designated as Staff Nurse, five (22.73%) are Health Assistants, 5 (22.73%) are AHWs of whom 3 are senior AHWs, and 3 (13.64%) are ANMs.

Approximately two third (63.6%) of AAs were found to be moderately satisfied while over one fourth were highly satisfied from the training. Most of the AAs considered that practical and operation theater experiences were very good while the theoretical portion of the training was considered to be very good by only over half (54.5%) of the respondents.

Over half of the AAs (N=11) were very satisfied with the trainer and his/her efforts in training them in anesthesia during the training while the rest were moderately satisfied. However, since all the trainers were foreigners, language was a problem during the initial period of the training.

Most of the AAs were impressed by the quality of materials distributed during the training. However, some AAs felt that lack of models, dummies and pictures were felt repeatedly during the training.

Approximately three fourth (72.7%) of the participants said that the six months duration of the training was just right. The AAs suggested that the training should include more exposure on general anesthesia, complications related to anesthesia, and, regional blocks.

Judging by the service statistics and interaction with the different respondents it was found that the overall client flow, particularly for CEOC services, in the health institutions have increased after the AAs have started providing anesthesia services. The doctors opined that the hospital services have become more complete and regular due to the availability of Anesthesia Assistants in the hospitals. The doctors also felt that the presence of AAs has considerably decreased their workload and tension during surgery. The impact is felt in the CEOC services because even the well to do people of the community trust the surgical services of the health institution rather than going to higher centers for delivery. Thus it can be inferred that the maternal and neonatal mortality has also gone down due to the life-saving services available in the districts.

Despite having very favorable impressions of the training, the AAs faced some problems during the six months training. The medium of instruction in English language was a big hindrance in comprehending the theoretical portion of the training. Some logistical problems were faced when the training was non-residential. Also some of the AAs considered that the allowance provided during the training was inadequate in meeting the cost of residence, transport and other daily necessities. Another problem mentioned by the AAs was the lack of adequate dummies, dolls and pictures during the training. Lack or shortage of these materials created problems in applying the acquired knowledge and skills.

A true/false (full marks 100) test administered on the AAs demonstrated that the AAs are highly knowledgeable on different issues of anesthesia that they were trained in. While

more than 50% of the AAs scored above 75 in the test, around 33% scored between 70-75 and rest scored below 65. The average score of AAs was 75.7.

Most of the AAs, over 80%, were found to be competent in all aspects of providing spinal and intravenous anesthesia, while only around 40% of the AAs were found to be competent in providing general anesthesia under bag and mask or with intubation and paralysis.

Due to non-practice of intubation and very few cases of general anesthesia, most of the AAs are losing the skills or will lose the skills in due course of time. Very few AAs were seen to be confident in managing intubations and general anesthesia under bag and mask. Thus some experts have expressed their views as to continue strengthening AA's skills in performing intubations just for the purpose of patient resuscitation and not necessarily for surgery.

Of the eight hospitals sampled with the six month trained AAs, only three hospitals provide elective surgery facilities. With one hospital providing no surgical services, the rest seven hospitals provide 24-hour emergency surgery facilities. Some three fourth (9 out of 12) of the six month trained AAs are involved in surgeries performed in their hospital. Of the 9 AAs involved in surgeries, three of the AAs are on 24 hour duty with no replacements while the rest six are involved in surgery on a rotational basis.

Of all the six month trained AAs interviewed, 58% provide service not only within the operation theater but also in other places inside the hospital. These AAs were observed to be a dynamic lot providing services in the wards, the OPD, emergency, and labor and delivery rooms. Some 25% of the AAs are also providing anesthesia services outside the hospital.

Over 70% of AAs have faced complications during surgery which include hyper and hypo tension, cardiac arrest, respiratory failure, hemorrhage, post spinal headache, etc. Generally it is AAs responsibility to monitor and manage the complications during surgeries but it was found that most of the AAs inform the operating doctor, in case any major complication occurs, and ask for his/her help to stabilize the patient. However, there is no practice of maintaining records of complications in most of the hospitals.

As regards the anesthesia technique used for LSCS, it was found that all AAs use spinal anesthesia. Spinal anesthesia was the most preferred technique for appendectomy. Most of the AAs administered GA under bag and mask for laparatomy. However at times, spinal combined with IV anesthesia was also used for laparatomy. IV anesthesia using ketamine was administered for incision and drainage and child's closed reduction fracture. Almost all the respondents said that IV anesthesia was administered for manual removal of placenta in their hospitals.

Of the eleven hospitals that provided some data related to surgery, six were zonal hospitals while the rest five were district hospitals. The study team found that it was difficult to get consistent data related to the different kinds of surgeries that were being conducted in the hospitals. In the past eleven months between August 2003 and June 2004, from the partial (incomplete) data collected from the eleven hospitals, around 12,550 surgeries took place out of which around 2550 were LSCS cases. Of the rest, around 60% were minor surgeries.

In the six zonal hospitals, over the past year (read 11 months), around 11,200 surgeries were performed out of which around 4,480 were major surgeries while the rest were minor surgeries. Around 2,350 LSCS were performed in the zonal hospitals and the percentage of LSCS over total surgeries is around 21% while the percentage of LSCS over major surgeries comes to around 53%. In the five district hospitals, over the past year (read 11 months), around 1,350 surgeries were performed out of which around 540 were major surgeries while the rest were minor surgeries. Around 200 LSCS were performed in the district hospitals and the percentage of LSCS over total surgeries is around 15% while the percentage of LSCS over major surgeries comes to around 37%.

Since on average around 40% of the surgical cases of the hospitals are LSCS cases, majority of the surgical services being provided by the hospitals are for Emergency Obstetric Care and thus it can be inferred that the surgical services of the hospitals have made a big impact on the reduction of maternal and neonatal mortality. The availability of the services of the AAs has made this possible in most hospitals.

Around 55% of the AAs are highly satisfied from being a health service provider, around 36% were moderately satisfied, while one AA was indifferent. As regards to their satisfaction in being an anesthesia assistant, the responses were almost the same.

Around 54% of all respondents were knowledgeable that they have a job description. However, only two respondents were able to provide copies of their job description. But all the AAs were unanimous on the issue that the new work of anesthesia that had been entrusted to them was not in their job description.

The absence AAs severely affects the surgical services of all hospitals.

The working relationship of most of the AAs with the doctors and their colleagues is cordial and they have formed a good team for the management of anesthesia services. However, the AAs currently not providing anesthesia services seem to have a somewhat strained relationship with the doctors.

While most of the hospitals provide allowances to the doctors for the surgical services that they provide, only around 25% of the sampled hospitals are providing extra allowances to AAs for their services. All respondents, including the Hospital Management Committee Members, feel that the AAs should receive allowances for their services.

Most of the AAs felt that at present they were receiving no opportunities to enhance their anesthesia skills and knowledge. The AAs feel that they need to receive refresher training regularly in order to update themselves on anesthesia and to reassess and revitalize their skills.

All the respondents of the study were unanimous in their opinion that the AAs required a separate designation and that the Government should create a separate post with the title of Anesthesia Assistant, to work exclusively in the operation theater.

The following were some of the enabling factors that motivated the AAs:

- The AAs mentioned that their esteem amongst their colleagues has increased after they received the AA training and started providing anesthesia services.

- Most of the AAs have cordial relations with the doctors and their other colleagues in the hospital and they feel that their colleagues also help them in their work whenever there is a need.
- The doctors find the AAs to be skilled and entrust them with complete responsibilities in managing anesthesia during surgeries.

The following were some of the factors that hindered the performances and functions of the AAs:

- The surgeons are not trusting on the skills of the AAs completely because of the lack of relevant information on the training and the skills acquired by the AAs.
- Lack of adequate anesthesia equipment in the hospitals cause problems in providing safe anesthesia services.
- Lack of surgeries in some hospitals is a big hindering factor to the AAs.
- Lack of supervision and monitoring of AAs.
- Most of the AAs are not provided with any kind of allowances for the work that they do in the Operation Theater.

As regards to the number of AAs required per hospital, and in order to implement the 15-year National Safe Motherhood Plan (2002-2017), based on the recommendations of the respondents and the current workload based on the service statistics, at least two AAs should be posted in each district hospital and three AAs in each zonal hospital. Thus in order to ensure that the 63 district hospitals mentioned in the 15-year plan are able to function as CEOC sites, a total of 126 anesthesia assistants are necessary.

The anesthesia assistant training has contributed significantly in the provision of life-saving surgical services, especially for CEOC, at district and zonal level hospitals thereby having a valuable impact in reducing maternal and neonatal mortality. The training is good in enhancing the knowledge and skills of AAs.

The impact of the training was found to be very positive as surgeries were being performed regularly in most of the hospitals where the trainees are posted. Referrals from these hospitals to higher centers have declined to a large extent, especially for delivery related cases because most of the hospitals provide LSCS services. In turn, referrals from other centers to the hospitals for different services, particularly for CEOC services have increased and are gradually increasing.

Overall, the six months anesthesia assistant training is found to be very good and has had a major impact on the CEOC services being provided by the hospitals sampled in the study.

The following are some of the recommendations related to improving the AA training the AA services:

- The training needs to be institutionalized and conducted in Nepali.
- The training materials should be translated to Nepali.
- The trainer or another resource person should facilitate the transition of each trainee into his/her institution from training to service provision.
- The surgeons working with the AAs should be updated on the content of the training and the skills of the AAs.

- The AAs should be periodically supported with resource materials and further training opportunities so as to maintain and enhance their skills.
- The training needs to incorporate a topic on basic maintenance of anesthesia equipment.
- The trainers should request and analyze information about the setting of OT and the equipment available in the trainee's hospital before the training.
- All equipment should be checked for completeness before sending to the hospitals.
- The job description of the AAs needs to be developed and their level of responsibility clearly spelt out.
- Record keeping of complications and surgery related data is weak and the practice needs to be started
- The AAs should continue the practice of maintaining anesthesia charts.
- HMG needs to introduce a separate position of Anesthesia Assistants in the health system.
- A system of network should be developed between the AAs and Physician Anesthetists working closest to their health center.
- The AA's intubating skills should be strengthened for the purpose of patient resuscitation.

A. Introduction

The National Safe Motherhood Policy aims at increasing the availability and accessibility of quality comprehensive essential obstetric care (CEOC) at the fist level referral center (district or zonal hospital). The provision of safe anesthetic care is an essential element in ensuring the availability of quality surgical obstetrics 24 hours a day.

Hence, in 1996, a three-month anesthesia assistant course was launched with financial support from WHO. The Department of Anesthesia of Bir Hospital was selected as a training site. This course continued up to year 2000, and approximately 50 Anesthesia Assistants were trained. A follow up was conducted with a few trainees and the findings suggested that physician specialist anesthetists were happy to have trained personnel assisting them in their work as "one extra pair of hands". However, during this follow up study, the skills of the Anesthesia Assistants were not assessed. Nevertheless this follow up of the three-month training experience led the policy makers to realize the importance of revising the course.

Therefore, in 2000, the Family Health Division decided to conduct a needs assessment to understand the capacity of the phase-one project-supported three CEOC sites in providing quality anesthetic care services (Baglung, Surkhet and Kailali). The findings suggested that all three hospitals had poor capacity to provide safe anesthetic care, mainly due to the lack of skilled anesthetic practitioners. Thus, in March 2000, FHD and the National Health Training Centre reviewed the existing three-month training course conducted at Bir Hospital.

This led to the creation of a new competency based six-month anesthesia assistant course. This training was piloted in Western Regional Hospital, Pokhara and the trainees were evaluated later. Based on the findings of the evaluation, the training curriculum was revised and endorsed by National Health Training Center. The responsibility of conducting this course was given to Patan Hospital and the first six-month course was conducted in 2001. Since then, five batches of training have taken place at Patan Hospital and two batches have been trained at Tansen Hospital. Altogether 24 Anesthesia Assistants have been trained so far.

1. The Anesthesia Assistant Training in Nepal

There is a general consensus that there is a desperate shortage of anesthetic skills outside a relatively small number of larger, regional institutions. Thus doctors working in zonal and district hospitals, who have surgical training, are rarely able to make use of their skills, and then only in a limited way. Effectively, their skills are useless and they are unable to fully and safely serve the needs of the local population. In particular, pregnant women and their babies are put at grave risk because of the lack of skilled, surgical interventions required for Safer Motherhood. Often patients are unable to undergo surgery unless they can afford both the time and money to travel to larger centers in Nepal or even India. Some patients requiring urgent surgery will simply be too unwell to travel further than their district hospital. Often patients are unable to undergo surgery unless they can afford both the time and money to travel to larger centers in Nepal or

even in India. Some patients requiring urgent surgery will simply be too unwell to travel further than their district hospital.

The doctors in zonal and district hospitals have to be competent over a very wide range of medical specialties and administration. In this situation, it is not realistic to maintain the high levels of skill required to deliver the technical aspects of anesthesia practice. In addition, it is generally regarded as unsatisfactory to have one doctor acting as both surgeon and anesthetist. The lack of adequate manpower means that it is often not possible to have two doctors working on a single patient.

Within the peripheral zonal and district hospital, in the context of anesthesia, the role of assistant is different from that required in a central hospital with specialist anesthetists. Centrally, the staffing levels are higher and there are dedicated specialists. At the district/zonal level, where the staffing levels are low, it is usual for there to be only one doctor attending to the obstetric and surgical emergencies. The doctor alone is unable to cope with many tasks necessary to perform and maintain anesthesia whilst carrying out surgery. Within this context an assistant must be competent in providing safe anesthesia services under the general supervision of the doctor.

In the short to medium term future, there are two options. In the first option, anesthesia remains confined to few centers, under the control of a small number of specialists, leaving the rest of the country with either no anesthetic service or in the hands of untrained doctors and nurses trying to overcome this desperate situation.

The Anesthesia Assistant Training is the result of the acceptance of the second option: paramedics and nurses be trained to provide safe anesthesia services particularly for obstetric cases.

Training Content

The AAT in Nepal is a competency based 6-month training program that stresses on learning by doing. Currently this course is designed to cover two weeks of theory and five and a half months of practical. The training course has the following learning objectives for each participant:

1. To be competent to assist in patient resuscitation.
2. To be competent to provide intermittent ketamine, spinal and general anesthesia.
3. To be competent in the peri-operative management of the patient.

The following is the course content of the program:

1. Basic Sciences
   - Anatomy
   - Physiology
   - Pharmacology

2. Anesthetic Equipment

3. Preparation for Surgery

4. Relaxant General Anesthesia
   - Indications
   - Anatomy of the airway
   - Induction of anesthesia
   - Control of the airway
   - Maintenance of relaxant general anesthesia
   - Reversal of relaxant GA

5. Intravenous Anesthesia
   - Introduction
   - Conduct of IVA

6. Spinal Anesthesia
   - Introduction
   - Basic sciences
   - Conduct of spinal anesthesia

7. Anesthesia for Special Circumstances
   - Anesthesia for maternity
   - Anesthesia for emergency cases
   - Anesthesia for pediatrics

8. Intra-operative Care of the Patient

9. Complications During Anesthesia
   - Cardiovascular complications
   - Respiratory complications
   - Allergic reactions

10. Post-operative Care of the Patient

11. Recovery

12. Analgesia

13. Anesthesia and Medical Conditions
   - Cardiovascular disease
   - Respiratory diseases
   - Nutritional disorders
   - Chronic renal failure

The participants of the training participate on an average 250 major cases of surgeries of which on an average 100 are LSCS, 100 cases are SAB and 50 cases are intubation. The knowledge of the trainees is evaluated three times during the course of the training. One test is administered before the start of the training program, one after the fourth month and the last at the end of the training program.

2. Literature Review of National and International Documents Related to Non-Physician Anesthesia Assistants

Anesthesia has played a very vital role in development in the field of surgery but of late the lack of anesthesia care all over the world has been greatly experienced. Hence the need for a research to determine the levels of anesthesia care provided and its recognition worldwide. No research of this kind has been undertaken till date but the results can help in assessing the shortcomings in current practices and how anesthesia care can be improved. This report addresses similar studies of educational programs for nurses providing anesthesia care in various countries, the pros and cons of certified registered nurse anesthetists (CRNAs) and anesthesiologists and the condition of anesthesia care in some countries. It highlights the fact that although in many countries nurses have been providing anesthesia care and services, the government does not recognize their training.

The history of anesthesia dates back to the 13th century when a Spanish chemist, Lillius, distilled ether as a liquid. The continent of Europe is said to have been made more aware of the state of anesthesia by a Scottish obstetrician, Sir James Simpson in 1853 by the use of chloroform as an anesthetic for Queen Victoria's eighth delivery and Nurse Anesthesia was brought to the North American continent by a German Catholic nursing order that established hospitals along the railroads as they traveled west across the United States. Many ordinary nurses were trained by physicians to provide anesthesia care as health care reached out to distant stations of the world. [1]

Various studies of the education programs for nurses providing anesthesia care have been taken from all over the world. These studies have pointed out the condition of anesthesia care in various countries. A study about the educational processes for nurses administering anesthesia care internationally came in 1991 in Oslo, Norway at the 3rd International Congress for Nurse Anesthetists. Although due to language barrier and distance, the information provided in this report was not comprehensive, it was a start to the first educational forum at the 4th World Congress for Nurse Anesthetists in Paris, France in 1994.[2]

The International Federation of Nurse Anesthetists (IFNA) was chartered in June 1989 in which 11 countries were made members. During the Oslo meeting, educators who were elected to survey the educational process of nurses providing anesthesia care in countries of the world presented their results. The data were ranked into three educational groups of instructional structure provided by the individual institutions – Primary, Secondary and Advanced.

Questionnaires were sent to many countries all over the world to assess the anesthesia education levels and the data was compiled with the information sent by countries that responded to the questionnaire. A descriptive analysis was conducted by country grouping. Sixteen countries in Africa stated that nurses entering the anesthesia education

[1] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 484
[2] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 484

program were prepared for patient care in a 3-year diploma nursing school.[3] Europe was addressing a standard for nursing education that would initiate a European License for registered Nurses instead of having each county provide individual licenses.[4] In the United States a national accrediting body, the Council on Accreditation of Nurse Anesthesia Education Program, accredited the anesthesia education programs. Accreditation was necessary to receive federal funding from the federal government.[5] In the United Kingdom, theatre nurses assisted physician anesthetists in anesthesia care. A certificate of anesthesia care was provided to nurses leaving the UK to practice anesthesia care outside the country however no organized program was presented.[6] It was found that countries such as Philippine Islands and Mexico were behind in providing this education to nurses.[7] Saudi Arabia and the United Arab Emirates employed nurse anesthetists who were educated in other countries such as Europe and Korea.[8] The report shows that the western world had longer training periods and more training institutes. Most countries had programs of two to three years duration in nurse anesthesia and the educational process generally required around two years of clinical nursing experience.

In a study undertaken by an exploratory international survey between 1993 and 1996 where 107 countries were contacted via questionnaires, it was found that mostly nurses looked after anesthesia care and many of them performed certain essential functions with or without physician anesthetists in attendance.[9] Almost 60% reported that nurse anesthetists received two to three years of basic training. Only half the respondents claimed that continuing education programs in anesthesia were available in their countries. These programs were commonest in the European region and least available in the African region and the south East Asian region.

The NCNAE (National Commission on Nurse Anesthesia Education) was implemented in 1989 due to a severe shortage of CRNAs (Certified Registered Nurse Anesthetists). Its responsibility was to scrutinize all aspects of nurse anesthesia educational programs. The commission's work and programs resulted in an increase in annual graduates from nurse anesthesia programs and 10 new programs were developed.[10]

In 2001 an analysis of labor supply and demand for anesthesiologists since 1993 was taken. After studying data from the American Board of Anesthesiology the Department of General Anesthesiology, The Cleveland Clinic Foundation, Ohio found that the shortfall of

[3] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 486
[4] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 488
[5] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 492
[6] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 489
[7] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994
[8] "An International Study of Educational Programs for Nurses Providing Anesthesia Care"-Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 62 No. 6, Dec. 1994, Pg. 488
[9] "Practice and education of nurse anesthetists" – Bulletin of the World Health Organization, 1999, Pg. 268
[10] "The National Commission on Nurse Anesthesia Education 10 years later – Part 2" - Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 69 No. 6, Dec. 2001, Pg. 455

anesthesiologists would continue through 2005. The shortage in 2002 was estimated at 1100-3800 anesthesiologists and the number is expected to be 500-3900 by 2005.[11]

The subject of who can provide anesthesia care is a long debated one. Since the 1800s nurses have provided anesthesia service. Studies have shown that due to shortage of anesthesiologists in most countries the nurses' end up providing anesthesia care and very often the anesthesia education of the nurse is of a short duration or merely based on observation. The Texan Association of Nurse Anesthetists (TANA) undertook a study to asses the differential costs of preparing nurse anesthetists and anesthesiologists. On the basis of various data it was found that it cost approximately $635, 000 to prepare an anesthesiologist while the cost of preparing a CRNA in Texas was $59, 000. In other words 10 CRNAs could be prepared for the cost of one anesthesiologist in addition they could put in more years of service as professional nurses as compared to the anesthesiologist.[12] However it must be acknowledged that the nurse could never take the place of the physician

Anesthesia care especially in many parts of Asia as well as many countries in Africa is lagging behind due to various reasons such as a lack of awareness of the subject, insufficient reference material and a lack of certified registered institutions providing nurse anesthesia education.[13] An example of the lack of awareness of anesthesia care is the case of Dr Michael Kavum of Uganda who after participating in a 2 month course where they were taught to keep their anesthesia safe but simple. He returned to his hospital with an enlightened perception of anesthesia. Mistakes such as the use of halothane without supplementing it with oxygen and use of 5% Thiopentone rather than 2.5% were rectified.

One of the anesthesia assistance programs started in Mwanza, Tanzania by Dr Zutz is a 12-month curriculum, where the students are, for the most part, nurses who have had no previous anesthesia experience.[14] The emphasis is on basic care, which is limited due to shortage of facilities as well as personnel. While the general way to assess student progress is to give regular tests Dr Zutz takes on a more interactive option, which he recommends to others as well. In this teaching method he constructs cases that the students work on in small groups over the weekend and then present their cases on Mondays.[15]

Asia is lagging behind in anesthesia care due to a shortage of manpower as many of its anesthesiologists go to other countries that are economically and politically more stable and provided better amenities for them in their work place as well as homes.[16] In a study that was conducted only 26.5% nurses reported that they had adequate knowledge of

[11] An updated view of the national anesthesia personnel shortfall" – Anesthesia Analgesia, 2003 Jan, Pg. 207-14
[12] "Health educational costs, provider mix, and healthcare reform; A case in point – nurse anesthetists and anesthesiologists"- Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 64 No. 1, Feb. 1996 Pg. 48
[13] "A Short Course in Anesthesia for Doctors in Rural Uganda" – World anesthesia news, Vol. 2, No. 1, 1998
[14] Personal Communication
[15] Personal Communication
[16] "Anesthesia Manpower Shortage in Asia – Discussion" - World anesthesia news, Vol. 3, No. 1, 1999

how to use and solve problems of anesthetic machines. [17] In Nepal, prior to 1956 there were no qualified anesthesiologists. Although today nurses are being trained to give anesthesia care and are working in hospitals, the Ministry of Health has not recognized their training.[18]

Through the various studies that have been undertaken all over the world it is evident to see that anesthesia care has to an extent been neglected by governing bodies in countries all over the world. Today most health analysts agree that we have too many physicians, particularly specialists and the general overage of medical specialists would mean spending billions of dollars in educating them.[19] The future of nurse anesthesia practice and education depends heavily on government leadership in improving the organization and regulation of nursing and health services.[20] The shortage of anesthesiologists, as well as, the cost of preparing them has brought about a simple solution of training nurses to administer anesthesia keeping in mind that they are a cheap and effective option. Seeing as many nurses are already administering anesthesia and that they have been the major hands-on providers of anesthesia services since the late 1870s,[21] the focus should now be on building more educational institutes that recognize the anesthesia training administered to nurses. In developing more Certified Registered Nursing Programs the lack of man power in this field can be addressed.

[17] "Anesthesia Manpower Shortage in Asia – Discussion" - World anesthesia news, Vol. 3, No. 1, 1999
[18] "Anesthesia in Nepal; Present and future aims" – Topical Doctor, 1997
[19] "Health educational costs, provider mix, and healthcare reform; A case in point – nurse anesthetists and anesthesiologists"- Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 64 No. 1, Feb. 1996 Pg. 59
[20] "Practice and education of nurse anesthetists" – Bulletin of the World Health Organization, 1999, Pg. 268
[21] "Health educational costs, provider mix, and healthcare reform; A case in point – nurse anesthetists and anesthesiologists"- Journal of the American Anesthesia Association of Nurse Anesthetists, Vol. 64 No. 1, Feb. 1996

3. Objectives of the Study

The main objective of the study is to assess the quality of the anesthetic services provided by Anesthesia Assistants at the CEOC facilities. Following are the objectives of the study:

Overall Objectives:

1. Assessment of the Anesthesia Assistant course – an assessment of the trainees' experience, inputs into the training, etc.
2. Assessment of the skills and knowledge of the Anesthesia Assistant – an assessment of the output of the training
3. Assessment of the impact of the Anesthesia Assistant on Safe Motherhood service delivery – an assessment of the outcome of to the training. For e.g., reduction in referrals, percentage of increase in C/S deliveries, reduction in incidences of deaths, etc.

Specific Objectives:

1. To assess the level of competence of trained Anesthesia Assistants to provide safe anesthetic services at their workplace
2. To assess the capacity of the CEOC hospitals to provide quality AA services
3. To assess the enabling and hindering factors in providing safe anesthetic services
4. To assess the contribution of the provision of AAs to increased utilization of emergency obstetric care in these districts (i.e., what would have happened in their absence?)
5. To assess the quality, duration and appropriateness of the training process and sites and to make any recommendations for change
6. To estimate the number of AAs required to meet the National Safe Motherhood Plan and suggest a realistic training and supervision plan towards this including identification of training sites
7. To identify the nature of future support needed from FHD, NHTC and EDPs to meet the training and supervision plan
8. To recommend steps for further recognize and institutionalize AA training in Nepal

4. Methodology

Study design

The study was conducted through the use of both quantitative and qualitative methods. The study team carried out on-site observations, self-administered tests, and, interviewed health service providers, and Hospital Management Committee Members, both formally and informally, through semi structured interview schedules. A literature review of national and international documents related to non-physician Anesthesia Assistants was conducted prior to the data collection to provide input on the design of the study. The major areas investigated were:

- the surgical services of the health institutions focusing primarily on anesthesia
- the six month Anesthesia Assistant training course
- skills and knowledge of the AA
- impact of AA on safe motherhood service delivery
- service statistics wherever available

Sample

The following were the service sites sampled for the study:

- District hospital - 9
- Zonal hospital - 6
- Sub-regional hospital - 1
- Regional hospital - 1
- Primary health care center - 3

Sampled Institutions

1. Mechi Zonal Hospital, Bhadrapur, Jhapa
2. Ilam District Hospital, Ilam
3. Koshi Zonal Hospital, Biratnagar, Morang
4. Sagarmatha Zonal Hospital, Rajbiraj, Saptari
5. Kanchanpur PHCC, Saptari
6. Solukhumbu District Hospital, Solukhumbu
7. Janakpur Zonal Hospital, Janakpur
8. Narayani Sub-Regional Hospital, Birgunj, Parsa
9. Baglung District Hospital, Baglung
10. Parbat District Hospital, Kusma, Parbat
11. Western Regional Hospital, Pokhara
12. Prithvi Bir Hospital, Nawalparasi
13. Prithvi Hospital, Kapilbastu
14. Dang District Hospital, Dang
15. Lamahi PHCC, Dang
16. Jumla District Hospital, Jumla
17. Surkhet District Hospital, Surkhet
18. Seti Zonal Hospital, Dhangadhi

19. Tikapur PHCC, Kailali
20. Mahakali Zonal Hospital, Mahendranagar

Respondents of the Study

Altogether data and information has been collected from 68 health service providers of different levels. The following were the respondents who were included in the evaluation study:

- Anesthesia Assistants - 22 (6 month trained - 13, 3 month trained - 9)
- Doctors - 28
- Peers of AA - 7
- Hospital Management Committee Members - 5
- BEOC Center Health Care Provider - 6

Data collection instruments

The research team used structured interviews, observations of AAs performance with the help of a clinical checklist, observations of the equipments of health facilities, records of service statistics, self-administered instruments and informal discussions to generate the relevant data. FHD, NSMP, INF and other stakeholders reviewed these instruments and checklists.

Data collection

A team comprising of 2 Senior Anesthesiologists, one researcher and four enumerators were mobilized for the collection of data and information from the field. Data was collected between June and July 2004.

Amongst the AAs included in this study, 13 had received the six months competency based training while 9 had received the WHO supported three months training in Bir Hospital. Of the 13 six months trained AAs included in this study, all received the self-administered questionnaire, 12 were administered with the semi-structured questionnaire and 11 AAs with the observation checklist. Thus the N for knowledge of the AAs is 13 while for the rest N is 11, unless specified otherwise, because one AA did not provide much information during the interview. For other respondents semi-structured questionnaire was used to collect the relevant data and information. The three months trained AAs were also administered with the self-administered questionnaire. Informal discussions were held with some medical superintendents and other doctors of some hospitals.

Data Analysis

Simple descriptive statistical tools like frequency and percentage was used to analyze the data. The findings have been analyzed and presented in the study using both quantitative and qualitative measures as have been applicable.

5. Limitations of the study

The major limitation of the study was the lack of adequate opportunities to observe the AAs administering anesthesia to patients during surgery. There were very few surgeries being done when the study team was in the hospitals. Therefore, most of the observations to assess the competence and skills of the AAs were conducted under role-play with the use of dummies or on volunteers. Thus the competence and skills of some of the AAs heretofore reflected may not portray the true competence level of the AAs, as when managing anesthesia for live-emergency surgeries.

As some of the doctors and the other respondents were not informed properly about the six months AA training, and they were just "aware" about it, detailed information about the various aspects of the training and the ways to make the training more effective, could not be obtained.

The study was also limited due to the unavailability of the data related to the levels of knowledge and competence of the AAs immediately after training. Although, the AAs were competent in all aspects covered by the training upon completion of the training, due to the unavailability of the data, the change in competence and knowledge due to the involvement or non-involvement in surgeries could not be properly assessed.

Similarly, lack of data related to complications, management of complications and surgical deaths in the hospitals and the lack of a uniform reporting system for surgeries limited the scope of the study in evaluating the anesthesia management services.

B. Findings

The findings of this study primarily portrays the services being provided by the Anesthesia Assistants trained in the competency based six months training course organized in Patan Hospital, Tansen Hospital and Maternity Hospital. Amongst the 13 such AAs included in this study, all received the self-administered questionnaire, 12 were administered with the semi-structured questionnaire and 11 AAs with the observation checklist. Thus the N for knowledge of the AAs is 13 while for the rest N is 11, unless specified otherwise, because one AA did not provide much information during the interview. References to the three months trained AAs (N=9) are made only in areas, where it is appropriate.

Due to diverse backgrounds of the doctors conducting surgeries in the hospitals included in the study, the term "surgeon" is loosely used in this report and denotes a doctor who performs surgery in the hospital. The doctor may or may not be a full-fledged surgeon but could also be an obstetrician, gynecologist or MDGP.

1. Profile of the respondents

The following respondents were included in the evaluation study:

- Anesthesia Assistants - 22 (13 six month trained AAs and 9 three month trained AAs)
- Doctors - 28 (comprising of Gynecologists, Obstetricians, Surgeons, MDGPs, Physician Anesthetists, and Medical Superintendents)
- Peers of AA - 7 (Primarily health care providers working in OT)
- Hospital Management Committee Members - 5
- BEOC Center Health care providers - 6

Profile of Anesthesia Assistants

The profile of the Anesthesia Assistants indicates that the AAs are relatively young with the youngest being 21 years of age while the oldest is 47 years old. Their educational qualification ranges from school leaving certificate to Masters in Nursing to Masters of Arts. While 14 (63.6%) AAs are male, the rest 8 (36.4%) female. Nine (40.91%) have received 3 months AA training; the remaining 13 (59.09%) have received 6 months AA training. The average years of service of AAs is 15 years. Almost all are married. All were found to be earning between Rs. 50,000 to Rs. 100,000 per year. But as per the information received from the doctors and the peers, three AAs were perceived to be earning more than Rs. 100,000 mainly due to their flourishing private practice.

Table 1. Designation of AAs in the Hospital

N=22

Designation	Frequency	Percentage
Anesthesia Assistant (All SN)	3	14.3
Staff nurse	6	27.27
A.N.M	3	13.64
Health Assistant	5	22.73
A.H.W.	5	22.73
Total	22	100

The designations of AAs seem to be uniformly distributed. While over one fourth (27.27%) of AAs are designated as Staff Nurse, five (22.73%) are Health Assistants, 5 (22.73%) are AHWs of whom 3 are senior AHWs, and 3 (13.64%) are ANMs. Three (13.64%) of the people working as AA are designated as Anesthesia Assistants in their hospitals. All these AAs who are designated as AAs have Staff Nurse as their educational background.

Profile of Doctors

A total of 15 doctors were formally interviewed and their designation in the hospitals are presented in Table 2 below.

Table 2. Designation of Doctors

N=15

Designation	Frequency	Percentage
Medical Officer (Senior - 2)	4	26.7
Medical Superintendent	4	26.7
DHO	1	6.7
Obstetrician and Gynecologist	1	6.7
Medical Generalist	2	13.3
Physician Anesthetist (HOD -1)	3	20
Total	15	100

Over one quarter (26.7%) of the doctors' designation was medical officer, with two of them being senior medical officers, and an even percentage of the doctors were medical superintendents. This was followed by the designation of physician anesthetists (20%) with one of them being the Head of Department of Anesthesia. Some 13% of the doctors are MDGPs. The average age of doctors was found to be 41 with the oldest being 51 and the youngest being 31 years of age. The average year of service for doctors was 13.5.

Profile of the Peers of AAs

Some 83.3% of the Peers' designation was staff nurse. The remaining 16.6% were designated as nursing in-charge. The average age of peers was 41.3 with the oldest being 46 and the youngest being 34. The average years of service for peers were considerably higher (21.7 years) compared to both the AAs and Doctors. Thus, in terms of services years the peers are ahead of the doctors and the AAs and thus the peers of AAs are more experienced.

2. Quality of AA training

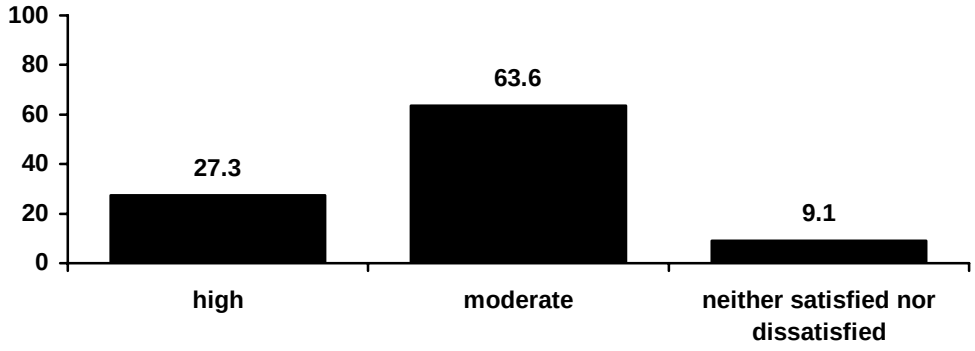
General awareness and perception about six months AA training

Almost all the respondents (N=68) were aware about the existence of the six months Anesthesia Assistant training. However, very few of the respondents, other than the 6-month trained AAs themselves, were aware of the content of the course and the outcome of the training, which a staff of their hospital had attended. All the respondents who had heard about the training had a very favorable attitude towards the six months Anesthesia Assistant training and were very much impressed by the services being provided by the health care providers who had received the training. The respondents felt that they were satisfied with the changes brought about by the trained AAs in their respective health institutions. They added that in Nepal's context AAs were a very important and useful cadre of health care providers for providing life saving services, especially in remote areas, to the poor and needy population.

Satisfaction of AAs from the training

All (11) AAs had a very favorable attitude towards the training received. They felt that the training was very relevant to the work they were doing at their respective health institutions. Despite the many strong and positive aspects of the training, over one fourth (27.3%) informed that the use of English language as a medium of instruction created problems in comprehension specially during the initial stages of the training.

Fig. 1. AAs satisfaction from training



N=11

Approximately two third (63.6%) of AAs were found to be moderately satisfied while over one fourth were highly satisfied from the training. Judging by the response of AAs overall satisfaction, it can be considered that AAs training was able to meet the expectations of the participants.

The doctors and the peers working with the AAs also felt that the AAs seemed to be satisfied with the training and were very enthusiastic to provide services after the training. They felt that the AAs had received good opportunity to learn about anesthesia during the training and were also of the opinion that the training was very important for the health institution as well because the surgical services of the health institutions could not be started without the AAs. Some of the doctors had observed the training being provided in

Patan Hospital and in Tansen Hospital and they said that they were very satisfied with the way the AAs were trained.

Perception on different aspects of training

Most of the AAs considered that practical and OT experiences were very good while the theoretical portion of the training was considered to be very good by only over half (54.5%) of the respondents. Some 45.5% of the AAs felt that the theoretical portion of the training was only average. The major reasons for this perception were, theory started right in the beginning of the training and since the language used was in English it was very difficult to understand. This created problems in comprehension of the theory and also posed problems later during the practical work. Other reasons given were that the two weeks dedicated to the theory was not adequate because anesthesia was a new subject to them, not having been exposed to it in the past educational and training programs, and thus it was rather difficult to grasp all the theoretical aspects in such a short period.

Table 3. Perception of AAs on different aspects of training

N=11

Aspects	Very good	Average	Weak
Theory	54.4	45.5	0
Practical	90.9	0	9.1
OT experience	81.8	0	18.2

But regarding the practical and the OT experience over 80% felt that it was very good and they felt that they were exposed to enough cases to learn well. Although the AAs felt that they were doing enough number of cases in the OT, they would still have preferred to be exposed to more surgeries as observers so that they could learn procedural issues from others, Physician Anesthetists and other AAs.

The doctors and the peers were not very conversant with the theory portion of the training but were of the opinion that with the previous health background of the AAs, they would not face many problems in understanding the theory portion. However, the doctors felt that ANM and the AHW would have problems in comprehending the various aspects related to anesthesia because of their limited exposure to anatomy. They suggested that the AA training should only be open to Health Assistants and Staff Nurses or above.

Opinion on Trainers and language used during training

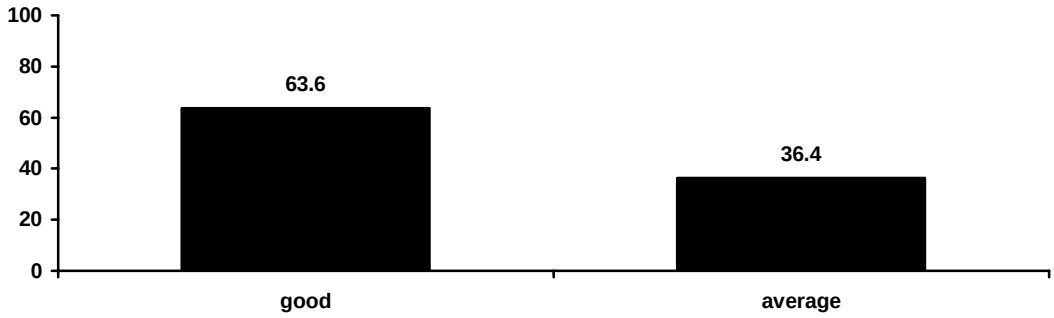
Over half of the AAs (N=11) were very satisfied with the trainer and his/her efforts in training them in anesthesia during the training while the rest were moderately satisfied. They felt that the trainers were very supportive and cooperative and imparted knowledge and developed skills very efficiently and effectively. However, since all the trainers were foreigners, language was a problem during the initial period of the training. Some of the AAs had a very difficult time getting used to the English and the accent of the trainers. However, they said that the trainers made every effort to make the trainees understand

and even dedicated time outside the classroom to simplify and clarify to the trainees who had problems understanding the subject in the classroom.

Quality of training materials

As the figure below demonstrates, most of the AAs were impressed by the quality of materials distributed during the training. Close to two thirds (63.6%) of the AAs considered that the quality of material distributed during the training was good. Interesting to note that over one third (36.4%) considered the quality to be average but none considered the material distributed to be either inferior or poor in quality. This again is a reflection on the quality of the materials distributed as well as the relevance of the materials in supporting the training.

Fig. 2. Quality of training materials



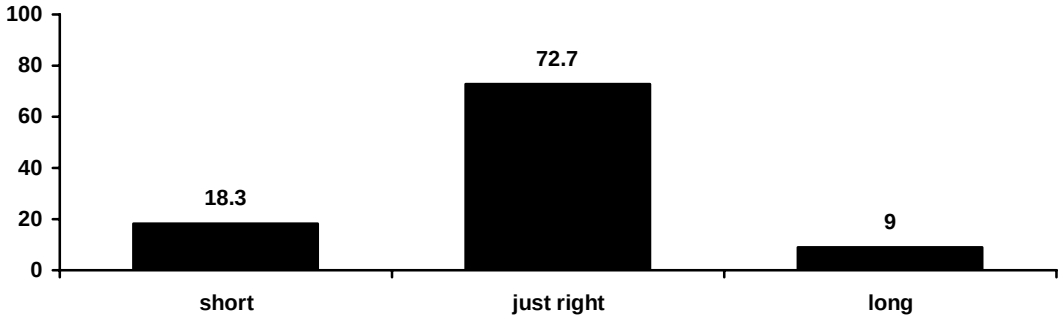
N=11

Questions were also asked to find out whether the adequate materials were available during the training. Eight in ten AAs (81.8%) felt that materials were adequately available during the training. However, some AAs felt that lack of models, dummies and pictures were felt repeatedly during the training.

Most of the AAs, though satisfied with the materials, expressed that it would have been better if the materials provided to them were translated into Nepali because the English language of the materials, though simple, was still difficult to comprehend at times.

Duration of Training

Fig. 3. Duration of training



N=11

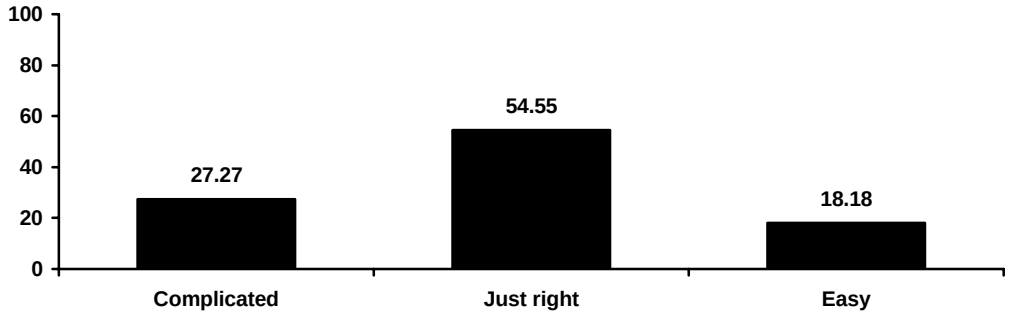
Approximately three fourth (72.7%) of the participants said that the six months duration of the training was just right and appropriate considering the issues that needed to be learned during the training. However around one fifth (18.3%) informed that the duration of training was short indicating that there was a need to include additional topics. They suggested that the training should include more exposure on general anesthesia and complications related to anesthesia, and, should also include topics of regional blocks.

The doctors also felt that, six months time period was adequate to train Health Assistants and Staff Nurses as Anesthesia Assistants. They said that their observation was based on the confidence with which the AAs were providing and managing anesthesia in the hospital currently. However, since they did not have adequate knowledge regarding the content of the training, they could not provide a more objective observation about the duration of the training. Considering that Diploma in Anesthesia for doctors is for one year, they felt that for Anesthesia Assistants, who were supposed to primarily work under the supervision of PAs, but should also be able to handle anesthesia independently as well, six months time period was appropriate. The peers did not have any comments regarding the duration of the training.

All the three months trained AAs (N=9) were unanimous in their opinion that the three-month training they received was short in duration and that they needed further training in order to update their skills, but more importantly, to make their anesthesia education more complete.

Perception on the technical level of training

Fig. 4. AAs perception on technical level of training



N=11

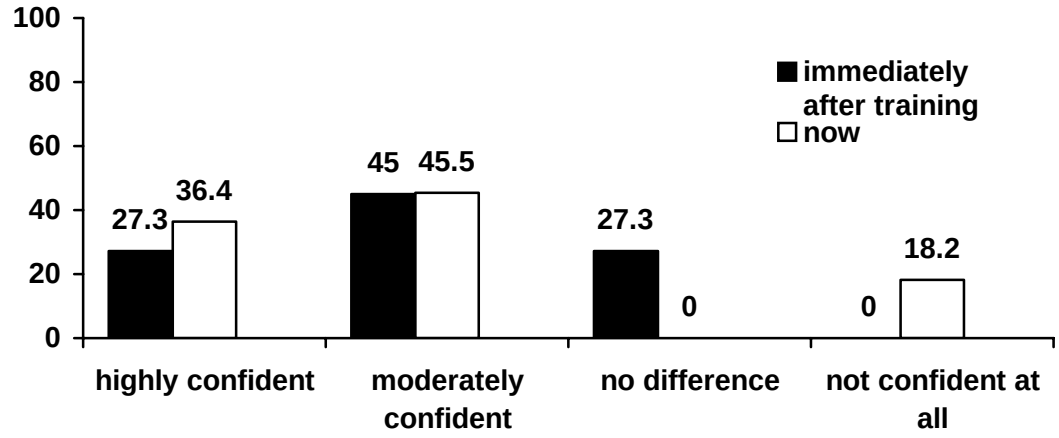
On the issue of the technical level of the training for the Anesthesia Assistants, just over half of the AAs considered that the level was just right and it was neither complicated nor very easy. These AAs felt that the trainers were excellent in explaining the information and technical content to the trainees effectively and in making them understand clearly. Of the one fourth who felt that the training was complex, they opined that being exposed directly to the theory of anesthesia right at the beginning made it difficult to understand the content. Also they felt that the subject was related directly to a patient's life and thus was complicated as well as complex. The rest of the AAs who felt that the training was easy for them said that they were exposed to anesthesia before the training as well in

their respective health institutions and thus did not find the content to be technically complicated.

The doctors were divided in their opinion regarding the technical aspect of the training. Almost half of the doctors felt that the training was of the right technical level for the people being trained while the other half felt that it was complicated as well as complex. None of the doctors felt that the technical level was easy. The doctors who were of the opinion that the technical level was right felt that since the objective of the training was to make them Anesthesia Assistants, it was not very complicated and complex and was of the level that the paramedics and nurses could comprehend. However, most of the doctors were of the opinion that the training was all right for HAs and SNs but complicated and complex for AHWs and ANMs. It is interesting to note that the AAs who regarded the training to be complicated and complex were in fact AHWs and ANMs. Thus the observations of the doctors have been confirmed by the AHWs and ANMs themselves.

Confidence level of AAs in providing anesthesia services after training

Fig. 5. AAs confidence level after training



N=11

The above figure illustrates that with continued practice the confidence level of the AAs in managing anesthesia services has increased. While only one fourth felt that they were highly confident in providing anesthesia immediately after the training, 36.4% felt that they were highly confident now. It is interesting to note that over one fourth (27.3%) did not feel any difference in providing anesthesia services either immediately after training or now. Despite receiving six months training around one fifth of the AAs (18.2%) replied that they were not at all confident to provide anesthesia services. One probable explanation for no difference may be due to the fact that some of these respondents have not been providing anesthesia services currently.

It is surprising to note that amongst the three months trained AAs (N=9), 62.5% were highly confident and 25% were moderately confident in providing anesthesia services immediately after the training. However, now only 25% of these AAs are highly confident and 62.5% are moderately confident. They iterate that the reason for this decline in confidence is the lack of adequate training in managing these problems that can arise while providing anesthesia.

Impact of the Training

Judging by the service statistics and interaction during the administration of the semi-structured questionnaire with the different respondents it was found that the overall client flow in the health institutions have increased after the AAs have started providing anesthesia services.

It was also found that after receiving the anesthesia training and providing service as Anesthesia Assistants the prestige and esteem of the AAs have increased amongst their colleagues and peers in their respective health institutions.

The communities were also found to be more trusting of the services of the institution after the start of surgical services in the hospitals. Previously the members of their community needed to travel to other districts for surgical services and were spending more time and money than necessary, but now they were receiving life-saving services at affordable price within their district itself. This has also meant savings in traveling time. The impact is felt even more so in the CEOC services because even the well to do people of the community trust the surgical services of the health institution rather than going to higher centers for delivery. Previously, as mentioned earlier, they used to avail the services outside the district.

It was also revealed that all the AAs considered this training to be superior to any of other trainings that they have received mainly because of the immediate opportunity to apply the knowledge and skills acquired through the training in their work. Moreover, this training has enabled the doctors of the hospitals to provide more life saving and critical services in the hospitals itself.

The doctors opined that the hospital services have become more complete due to the availability of Anesthesia Assistants in the hospitals and that their services had a significant contribution to the CEOC services of the hospitals because the women were receiving critical life-saving emergency services in their district itself and did not need to travel to other districts for LSCS and other surgical services. The doctors also felt that the presence of AAs has considerably decreased their workload and tension during surgery. They considered the AAs to be quite competent in anesthesia management and felt that they were now able to provide quality service to the patients.

Problems encountered during training

Despite having very favorable impressions of the training, the AAs faced some problems during the six months training. The medium of instruction in English language was a big hindrance in comprehending the theoretical portion of the training. However, this problem was felt only during the initial stage of the training. The AAs stressed that the use of English, to a certain extent, limited the effectiveness of the theoretical portion of the training.

Some logistical problems were faced when the training was non-residential. Setting up residence in an alien city, that also for just six months, managing food and laundry and

general upkeep of the residence created lots of problems that hindered on concentrating on the training. Also, arriving on time for the training was a problem for some AAs, as they had to use public transport. Also some of the AAs considered that the allowance provided during the training was inadequate in meeting the cost of residence, transport and other daily necessities.

Another problem mentioned by the AAs was the lack of adequate dummies, dolls and pictures during the training. Lack or shortage of these materials created problems in applying the acquired knowledge and skills.

Suggestions for improvement

Overall the AAs had a favorable attitude towards AA training and felt that the training was superior compared to other trainings they had received as evidenced by the response of 72.7% who considered the AA training to be very useful and helpful in providing life-saving emergency services. However the following were the suggestions made by the AAs and other respondents in making the training more effective:

- The theory and the practical portion should be taught simultaneously.
- The subject matter would be easier to understand if the training is conducted in Nepali and the training materials are translated into Nepali language.
- After completion of the training, the trainer or somebody from the training team should make a follow up visit to the trainee's health institution to help set up the OT.
- The doctors and the staff of the hospitals, where the trained AAs are posted, need to be properly briefed about the training course in detail and type of services the AAs are equipped to offer, and also to ensure smooth transition from training to service.
- All the respondents expressed that the training would be more effective and the pressure on the trainees considerably lower if the training was made completely residential.
- The AAs opined that they needed to be updated regularly on anesthesia through periodic provisions of more learning materials.
- Some of the AAs stressed that there was a great need to include more observation sessions during the training, regarding anesthesia services being performed by anesthetists or other Anesthesia Assistants.
- Almost all the respondents suggested that the AAs required regular periodic supervision.
- The AAs voiced the need for regular refresher training to ensure that they can update their skills.

- Some AAs recommended that the anesthesia charts used during the training needed to be similar to the one available in their health institution so as to maintain uniformity and ease of use.

- The AAs and the doctors felt that since currently there is no mechanism of supervising and evaluating the services provided by the Anesthesia Assistants, the work of the AAs is unrecognized and unchecked. The AAs need to be evaluated from time to time and good service providers need to be rewarded appropriately so as to motivate them in continuing their good work.

- Some AAs felt that the topic on regional blocks should be added to the training.

Doctors' opinion about AA Training

A total of seven doctors working with AAs who had received 6 months training were interviewed. It was found that a large majority (87.5%) was knowledgeable to some extent about the 6 months training. They, in general, found the training to be quite useful. They expressed that the hospital was benefiting as a result of the training.

Similarly, they opined that skills of the AAs have been enhanced and their confidence level has been boosted after receiving the training. Similarly, referrals from the health institution have considerably gone down while referral from other health centers have considerably increased. Overall, the surgeons had a very favorable attitude towards the six months training received by AAs. However, the surgeons stressed that they were not fully aware about the total content of the training and did not know the types of services the AAs were equipped to provide. They also mentioned that they have not been properly briefed about AAs performance during the training and the anesthesia techniques the AAs could competently administer.

More than half (57.1%) of the surgeons said that they had seen some of the materials provided to the AAs during training. Of those close to three fourth (71.4%) were of the opinion that the materials were quite good and were useful in increasing AAs knowledge and skills. In their opinion, the language used in the materials was also simple and effective.

The surgeons stressed the need for providing periodic refresher training to the AAs as was evidenced by the recommendation of 42.9% of the surgeons. Approximately 30% felt that the training would become more effective if the trainer or some other physician anesthetist would assist the trainee in establishing the anesthesia services effectively on-site. This would also help the surgeons to understand the level of competence of the AAs.

The surgeons were found to have a very favorable impression of AAs services. Over 85% surgeons found that AAs, after receiving training, were either highly skilled or skilled. The AAs are now providing assistance during surgeries and are also assisting in providing emergency services. The number of surgeries being carried out in the hospital has increased and likewise, the inflow of referral cases has increased.

As regards the CEOC services, the AA training was found to have the desired impact. Surgeons, in general, felt that community has more confidence in their hospital, as it has now been able to provide full CEOC services. All LSCS performed with the help of AAs have been successful. Prior to the AA training, CEOC cases used to be referred and now it is being managed in the hospital. Moreover, the doctors have now been able to provide surgical services, whereas in the past their surgical skills were unutilized.

Opinion of Peers of AAs on the AA Training

Most of the peers of AAs had just heard about the AA training but were not aware of the content and the details of the training. However, they felt that the training had good impact on the services of the hospitals. Some peers felt that now the anesthesia services had become safer compared to the past. Most of the peers were in-charge of the OT and

they felt that it is because of the AA that the OT has become fully functional. Their skills in managing the OT along with the surgical skills of the doctors are being utilized because of the availability of AAs in their hospital.

The peers, despite having limited knowledge about anesthesia and the training, felt that the duration of the training should be increased to a range of 9-12 months as they considered that anesthesia was a subject that required high degree of specialization. Some peers felt the duration of training was just right considering the need to balance both the theory and the practical portions.

While 50% of peers opined that the technical aspect of the training was appropriate for the paramedics' and nurses' level, 16.7% felt that it was too complex.

Despite having limited knowledge about anesthesia, the peers expressed that the AA training had been useful, as the AAs had gained extra knowledge and skills, which were reflected in their services provided by the AA. One peer mentioned, “The AAs' services have become more efficient and of better quality after the training”. All peers informed that AAs had been able to enhance their skills as a result of the training with 83.3% of the peers considering the AAs to be skilled. The peers confidently stated that outward referral had certainly gone down. The peers also mentioned about the favorable impact of AAs training on the CEOC services of the hospital. Overall, the peers opined that AA training had been beneficial to the hospital, as it had ensured the regularity of surgery, reduced the workload of the doctors and the improvement of the maternity and emergency services. Furthermore the peers said that AAs confidence in their work had also substantially increased due to the AA training.

Only 33.3% of the peers had the opportunity to see the materials provided in the training. The rest mentioned that since AAs had not shared the materials they had not seen materials and thus could not comment on it. Of those who had seen the materials, they considered it to be either good or average. The peers felt that AAs would face difficulties in comprehending the English used in the materials.

Half of the peers had the opinion that the standard of training was average, and, in order to make the training more effective, they suggested the following:

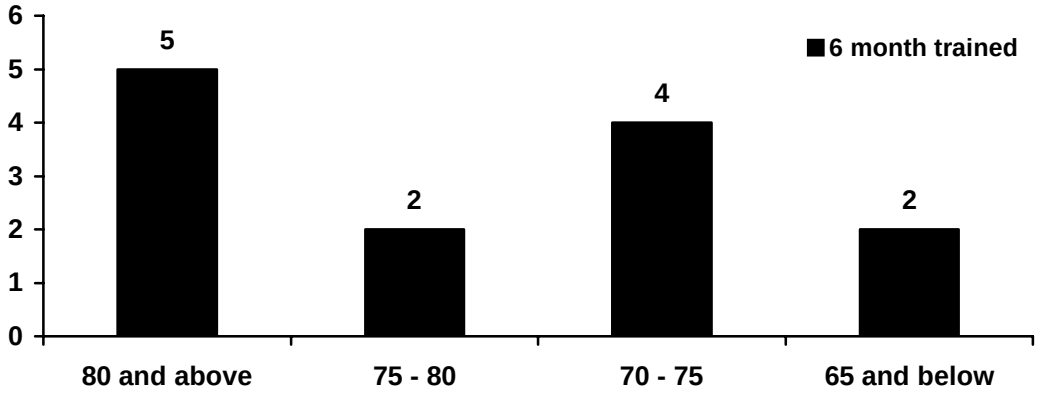
- Regular supervision
- Refresher training
- Simpler selection procedure
- Allowing all the trained AAs to practice
- Increasing the duration of the training

3. Competence of trained Anesthesia Assistants

Knowledge

All the Anesthesia Assistants sampled for the study were administered a written test to evaluate the level of knowledge they had retained from the training. This test consisted of true/false statements matching exactly to the one that the Anesthesia Assistants had taken during their training. The answers were graded with one mark given to each answer. The total was out of 100.

Fig. 6. Knowledge level of AAs



N=13

The above information shows that the AAs are highly knowledgeable on different issues of anesthesia that they were trained in. While more than 50% of the AAs scored above 75 in the test, around 33% scored between 70-75 and rest scored below 65. The average score of AAs was 75.7. The highest score was 85 and the lowest score was 64. Considering that the AAs are exposed to limited surgeries in the hospitals, it was surprising to note that they still retained high levels of knowledge on anesthesia, signaling the good quality of training that they received.

Skill of AA

The skills of the six-month trained Anesthesia Assistants on the various anesthesia techniques were evaluated through on-site observation. Using a checklist, the Anesthesiologists observed the AAs (N=11) performing the various tasks either on a patient, on a volunteer or on dummies using role-play.

The following were the criteria of evaluation:

- Poor. Step or task not performed correctly or out of sequence (if important) or is omitted. Incompetent.
- Moderate. Step or task performed correctly in proper sequence (if important) but does not progress from step to step efficiently. Competent but needs supervisor nearby.
- Good. Step or task efficiently and precisely performed in proper sequence (if important). Competent and can function independently.

The following were the tasks evaluated:

- Setting up the theater
- Preparation of patient
- Set up an IV infusion
- Perform Bag & Mask Ventilation
- Perform laryngoscopy/Intubation
- Providing spinal anesthesia
- Relaxant general anesthesia
- Intravenous anesthesia

Results:

Setting up the theater

Over 50% of the AAs (N=11) were found to be competent in almost all aspects of setting up the theater. While around 50% of the AAs were found to competent in constructing the anesthesia circuit and checking the circuit functions, the rest were found to be poor. This could be because the circuit is rarely disconnected in the operation theater. However, in preparing the oxygen supply, suction apparatus, preparing for bag and mask ventilation, preparing for intubation and preparing the IV fluids, drugs, and monitors, on an average around 70% of the AAs were competent. Of the rest half were competent but required prompting to remember some points while the other half were incompetent.

Preparation of patient

Over 60% of the AAs were very competent in all aspects of preparation of the patient for surgery. While around 60% were competent in pre-operative assessment of the patient and checking patient history, 33% were found to be incompetent in relating the points of the patient examination to anesthesia. Over 75% of the AAs were competent in attending to the psychological considerations of the patient, in connecting the monitors and in establishing and intravenous drip.

Set up of IV infusion

Overall, most of the AAs (over 90%) possess good skills in setting up an IV infusion and are very competent. They were observed to be very skillful and confident in setting up IV infusions even in small children, and, their skills are further exemplified by the fact that they are called to the ward and to the emergency to set up IV infusions for patients whose veins are difficult to find.

Perform Bag and Mask Ventilation

Around 42% of AAs are competent in performing bag and mask ventilation independently, while 50% are competent but need periodic supervision. However, most of the AAs are not providing anesthesia services through bag and mask because of various reasons ranging from lack of equipment, lack of medicine and reluctance of surgeon to use GA,

and, thus some of them seem to have lost confidence in their skills and ability. But overall, they still retain most of their skills in opening the airway and performing ventilation.

Performing Laryngoscopy / Intubation

Only 33% of the AAs were found to be competent in performing laryngoscopy and intubation while amongst the rest 67% half were found to be competent but needing constant supervision, while the remaining half were incompetent. None of the AAs evaluated are practicing intubation in their hospitals and it was found that they have lost some of their skills. While some AAs have intubated some seriously ill patients in the emergency, they have not provided general anesthesia with intubation and paralysis and are very scared to do so. It was observed that even the 33% of the AAs who were competent were not very confident in the procedure of performing laryngoscopy and intubation.

Providing spinal anesthesia

This is a service that most of the AAs are providing in their hospitals. Around 70% of the AAs are very competent in most aspects of providing spinal anesthesia. While over 90% are competent in positioning the patient and getting the patient ready for the lumbar puncture, performing the lumbar puncture, i.e., from advancing the spinal needle to the flow of CSF and in providing the spinal anesthesia, only around 60% are competent in the care of the patient after spinal anesthesia, post lumbar puncture tasks and post-operative care. None of the AAs were found to be incompetent in any aspects of performing the lumbar puncture or providing the spinal anesthesia. Very few AAs use local anesthesia while providing spinal anesthesia. While around 42% do not use local anesthesia at all, amongst the rest who prepare local anesthesia few are good in actually providing it. Around 50% of the AAs are poor in hand washing before starting the procedure and 33% do not drape the patient properly. Overall, most of the AAs are highly skilled in providing spinal anesthesia. Over 25% of the AAs do not use an introducer while performing the lumbar puncture and are very confident in using the needle directly for the puncture. The skills of the AAs in providing spinal anesthesia is further highlighted by the fact that very few of the spinal cases done in all the hospitals evaluated have failed so far over the past two years.

Relaxant general anesthesia

Around 60% of the AAs are not providing relaxant general anesthesia and their skills could not be observed during the evaluation. Of the rest 40%, half of the AAs were competent and half needed supervision and prompting.

Intravenous anesthesia

Most of the AAs were found to be competent in almost all aspects of providing intravenous anesthesia. While over 75% of the AAs were competent in all aspects of providing intravenous anesthesia, one AA was found to be incompetent in most aspects. Of the rest 16% who had moderately competent skills, they were not confident on the dose of ketamine and in maintaining the airway as required. One AA was confused on the

issue of whether ketamine could create bronchospasm in children because a Physician Anesthetist had faced a problem with a child's airway during a Government Camp and the doctor she is currently working with had developed this idea and asked her to stop using ketamine in children.

Managing complications

Three fourth of the AAs were found to be competent in managing hypotension while conducting LSCS under spinal anesthesia. The rest were not very competent because they were unsure about the dose of the vasopressors. Around 70% of the AAs were moderately competent in managing circulatory collapse during I/V drug induction and some of them require supervision. Around 30% were unsure of the dose and route of adrenaline. Around 60% of the AAs still maintain competent skills in managing intubation failures even though they have not been providing GA with intubation.

Overall Skills

Most of the AAs (around 80%) were found to be competent in all aspects of providing spinal and intravenous anesthesia, while only around 40% of the AAs were found to be competent in providing GA under bag and mask or with intubation and paralysis. In around 60% of the cases, the AAs are not involved in the post operative care of the patients because it is generally done by the doctors and AAs are not encouraged by the doctors to pursue this. In general, the AAs are involved in all aspects of preparation of drugs and equipment, provision of anesthesia and maintenance of patient during the surgery. Even the complications that occur during the surgery are generally managed by the AAs. The surgeons validated this fact as well.

Due to non-practice of intubation and very few cases of general anesthesia, most of the AAs are losing the skills or will lose the skills in due course of time. Very few AAs were seen to be confident in managing intubations and general anesthesia under bag and mask.

Some of the AAs do not understand the reasons for the use of magnet over the patient-end valve of the OIB creating a dangerous circuit. Even the MDGPs working with these AAs were unaware of the problem.

4. Capacity of CEOC Hospitals in providing quality anesthesia services

Some three fourth (9 out of the 12 respondents on whom the semi-structured interview was administered) of the six month trained AAs are involved in surgeries performed in their hospital. While 36.4% of the AAs mentioned that they were involved in surgeries immediately after receiving the six months training, the same percentage said that they were involved in surgeries only after some time. Of the 25% of the AAs not involved in surgery, one of them is posted at the DPHO and is called only when the other AA of the hospital is unavailable but which has not happened so far, one is not preferred to be used by the surgeon and for one surgery has not been conducted in the hospital so far. Of the eight hospitals sampled with the six month trained AAs, only three hospitals provide elective surgery facilities. With one hospital providing no surgical services, the rest seven hospitals provide 24-hour emergency surgery facilities.

Job Responsibilities of the AAs

Of all the six month trained AAs interviewed, 58% provide service not only within the operation theater but also in other places inside the hospital. These AAs were observed to be a dynamic lot providing services in the wards, the OPD, emergency, and labor and delivery rooms. Of the AAs working outside the OT within the hospital, around 70% provide resuscitation and anesthesia services in the emergency, around 57% provide different services in the OPD either as OPD in-charge or as regular service providers, around 43% provide regular services in the ward and one AA provides delivery and post-abortion care services. While four of these seven AAs feel that they are overloaded because of being posted in other places within the hospital besides the OT, three of the AAs are happy to be working in the OPD. One of these three does not want to be stopped from providing regular services in the OPD.

Table 4. Anesthesia Responsibility of AAs

N=9

Services	Frequency	Percentage*
Total Anesthesia management	9	100
Management of complication	6	66.7
General care of patient	3	33.3
Care during post op recovery	3	33.3

As per the above Table 4, all AAs involved in surgery (N=9) were found to be involved in total management of anesthesia during surgery while two thirds also mentioned that they were involved in management of complications, if any arose during surgery. In addition to total anesthesia management, one third of AAs were providing general care to the patients and also care during post-operative recovery. Of the 9 AAs involved in surgeries, three of the AAs are on 24 hour duty with no replacements while the rest six are involved in surgery on a rotational basis.

Of the six month trained AAs, 25% are providing anesthesia services outside the hospital. They informed that they were involved in providing anesthesia services at the doctor's clinics and in nursing homes. These AAs are primarily involved in providing spinal and

local anesthesia. The AAs informed that the outside services are available to all people who can afford to pay.

Thus it is evident that the sphere of work of AAs is not only confined to hospitals but they also provide services in clinics and nursing homes.

All surgeons were found to be providing resuscitation services to seriously ill patients and majority of the surgeons involved AAs in providing these services.

Complications during surgery or post-operative period

Over 70% of AAs have faced complications during surgery which include hyper and hypo tension, cardiac arrest, respiratory failure, hemorrhage, post spinal headache, etc. One AA also mentioned that a hysterectomy patient died on the OT table. The AA, however, was not sure whether the death was related to anesthesia or not. Generally it is AAs responsibility to manage the complications during operations but it was found that most of the AAs inform the operating doctor, in case any major complication occurs, and ask for his/her help to stabilize the patient.

It was found that only one hospital maintained the practice of keeping a record of complications,. This was more of an exception than the rule as evidenced by the lack of practice of keeping records of complications in other hospitals. Even for cases of surgical deaths, details of the death audit or autopsy is hard to find and thus it was not possible to ascertain if there have been deaths due to anesthesia. Although informal discussions revealed some instances of deaths on the OT table or in the post-operative ward, the evaluation team could not come across written records of the cases, and different respondents had different versions for the cause of death and thus a definitive picture could not emerge. However, the medical consultants of the evaluation team did feel that there were a few death cases that pointed to deaths due to anesthesia but in the absence of written records, no conclusions could be drawn.

Anesthesia techniques for different surgeries

As regards the anesthesia technique used for LSCS, it was found that all AAs use spinal anesthesia. In case of failure, which was found to be very few and far between, it was mentioned that either another AA or the doctor tries again, and in case of failure again, GA under bag and mask is administered. Likewise, few AAs also informed that LSCS have been performed using IV anesthesia.

Spinal anesthesia was the most preferred technique for appendectomy. However in some appendectomy cases GA under bag and mask was also used.

Most of the AAs administered GA under bag and mask for laparatomy. However at times, spinal combined with IV anesthesia was also used for laparatomy.

IV anesthesia using ketamine was administered for incision and drainage and child's closed reduction fracture. One AA however mentioned that the doctor was not confident in using ketamine for children because a Physician Anesthetist had faced a problems with

a child's airway during a Government Camp and the doctor had developed the idea that ketamine could create bronchospasm in children and subsequently the doctor asked her to stop using ketamine in children.

Almost all the respondents said that IV anesthesia was administered for manual removal of placenta in their hospitals. However, in one hospital it was found that no anesthesia was used. It is interesting to note that the BEOC centers sampled also practice the provision of IV anesthesia using diazepam for manual removal of placenta and for PAC-MVA. However, the health service providers of these institutions mentioned that they were not knowledgeable about the dose or the types of IV anesthesia appropriate during such procedures. These health care providers informed that they had learnt to give these medicines by observing doctors and other nurses in some other health institution in the past. They suggested that some basic anesthesia content should be included in the BEOC and PAC training that they receive.

From the above information it can be considered that the anesthesia services being provided by the AAs was thus found to be as per standard and satisfactory in general. While the AAs are involved more in the provision of spinal and IV anesthesia on a regular basis, GA is used only sporadically. However, it would be appropriate to note that GA under bag and mask is used more in zonal hospitals than in district hospitals because of the higher numbers and diversity of surgeries being conducted in zonal hospitals as compared to regional hospitals.

Record keeping

Table 5. AAs practice of record keeping

N=11

Types of Record	Yes	No	Total
Log book	36.4	63.6	100
Anesthetic charts	63.6	36.4	100
Complication Records	9.1	90.9	100

Table 5 clearly indicates that record keeping in general is not very encouraging. Two thirds of AAs did not maintain a logbook. They either did not know anything about a logbook or said that the OT nurses and the doctors maintained the logbook. Close to two thirds of AAs (63.6%) claimed that they were maintaining anesthesia charts, however, it was found that only 50% of the AAs have used anesthesia charts and of them not all are found to be maintaining them currently. Inspections of the copies of anesthesia charts maintained by the AAs reveal that they are competent in maintaining the charts. The AAs using the anesthesia charts pointed out that the chart they were taught to use during training were different from the ones available in their health institutions and thus used the anesthesia charts provided during the training. Once these ran out, the practice of maintaining anesthesia charts stopped. Over 90% of the AAs replied that they do not maintain records of complications while providing services. When probed for the reason for not maintaining records of complications it was informed that such practice did not exist.

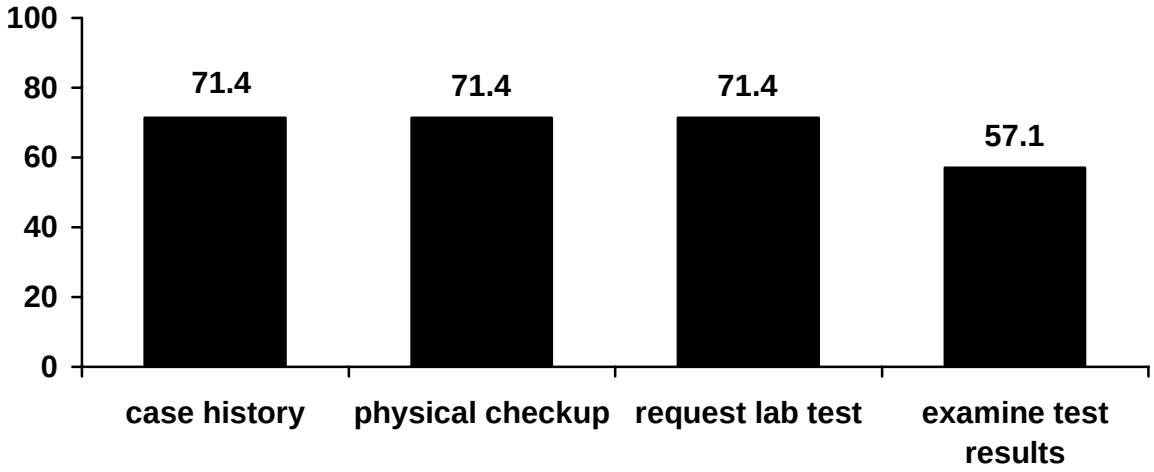
Pre–operative evaluation of patient

The study revealed that most of the AAs do practice pre-operative check up when provided the opportunity. However, in the present situation, many AAs are not practicing it because most of the surgeries happening in the hospitals are emergencies and the AAs only see the patient on the operating table. At this juncture, they just check the vitals of the patient, and the decision on whether to operate the patient or not, is taken totally by the doctor. Generally, doctors do not consult with the AAs to discuss with them the different issues related to the surgery and the risks involved in the surgery along with the general procedure that is to be followed.

The AAs mentioned that there have been instances when they have voiced their concern to the operating doctor regarding the poor condition of the patient and their hesitation to anesthetize the patient. In such cases the doctors compelled the AAs to anesthetize patients. There were two cases mentioned by the AAs, where the patient died during the operation procedure. However, there have also been cases where the doctors have referred the patient after the AA mentioned that the patient was not fit for anesthesia. As regards to elective surgery patients, very few AAs conduct complete pre-operative evaluation because the doctors inform them about the patients just before surgery. Some doctors do not admit the elective surgery patients in the hospital before surgery and thus the AA is not able to assess the patient pre-operatively. However all AAs felt that the pre-operative check up of patients are absolutely necessary before any surgery.

While the above being the general case, over 70% of the AAs replied that when they provide pre-operative checks, they carry out the following:

Fig. 7. Pre-operative evaluation of patient



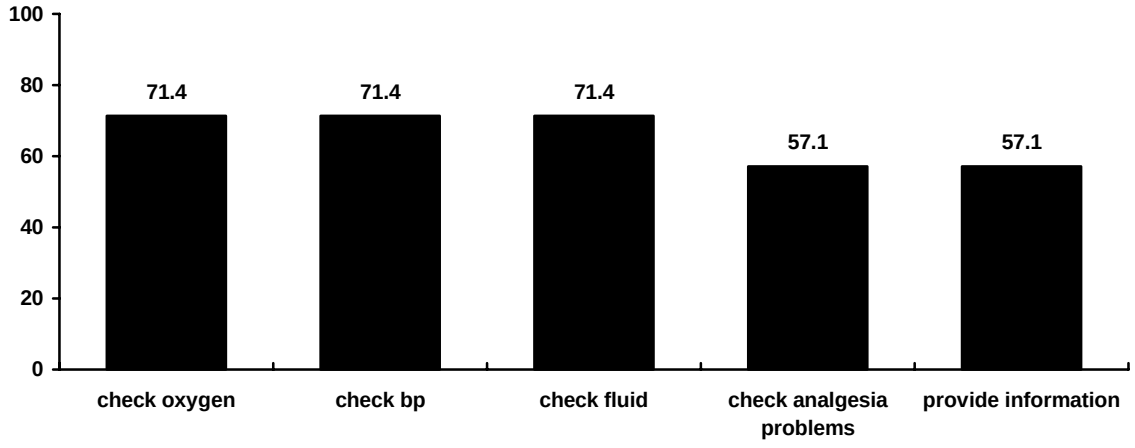
N=9

Post-operative care of the patient

Practice of visiting patients after the surgery exists as is evident in figure 8. Although during the skills assessment, more than 60% of the AAs mentioned that they were not involved in post-operative care of the patient, which was generally done by the doctors themselves, over 55% of the AAs mentioned in the interview that they are involved in

providing some form of post-operative care to the patient, either in the recovery room or in the post-operative ward. Of those AAs visiting the patients after surgery, they were found to be checking oxygen level, blood pressure level and checking the fluids while more than half (57.1%) were also dealing with analgesic problems and providing either written or oral information and instructions to the patients and their attendants.

Fig. 8. AAs practice of visiting patients after surgery



N=9

The AAs who do not visit the patients after the operation mentioned that the practice of visiting the patients virtually did not exist in the hospital. Others mentioned that the doctors conducted such visits and do not encourage the AAs to do so.

Surgeries conducted in the past year and capacity of CEOC hospitals in providing safe anesthesia services

Of the eleven hospitals that provided some data related to surgery, six were zonal hospitals while the rest five were district hospitals. The study team found that the management of data related to surgery was different in different hospitals. While some kept data on major and minor surgeries, some surgeries were classified as moderate surgeries as well. A consistent definition of major, minor or moderate surgery however could not be gathered from the respondents. Also it was difficult to get data related to the different kinds of surgeries that were being conducted in the hospitals. The current HMIS system provides data separately for LSCS cases only.

In the past eleven months between August 2003 and June 2004, from the partial (incomplete) data collected from the eleven hospitals, around 12,550 surgeries took place out of which around 2550 were LSCS cases. [22] Of the total surgeries, around 60% of the surgeries are minor surgeries and 40% are major surgeries. However, not all the hospitals classify the surgeries conducted as major and minor and some hospitals record the surgeries as a whole, whether they are major or minor. During analysis, for such hospitals, the same average percentage deduced from the other hospitals has been used.

[22] Data has been rounded to the nearest 50 or 100 because the data was not complete and the statisticians of the hospitals mentioned that the number of surgeries is actually higher than recorded in the statistics because of some missing information.

Around 15,650 deliveries took place in the hospitals. As per the statistics, the total number of maternal deaths in the eleven hospitals is 26. However, none of these deaths were found to be related to anesthesia complications.

The zonal hospitals have more surgery caseloads than the district hospitals. Of the total 12,550 surgeries, around 11,200 surgeries were conducted in zonal hospitals while the district hospitals accounted for the rest 1,350 surgeries. From the table below it is evident that on average each zonal hospital manages 170 surgeries while district hospitals manage around 25 surgeries per month.

Table 6. Number of surgeries conducted over the period August '03 - June '04

Type of Hospital	Frequency	Surgery	Average	Average per month
Zonal	6	11,200	1,867	170
District	5	1,350	270	25

It is important to note that the average per month of the district hospitals seems low as compared to zonal hospitals. This is because of the five district hospitals whose data have been presented here, one hospital has just started conducting surgeries in the past month and in another hospital major surgeries have not been conducted for the past six months. Thus the actual average of the district hospitals, when considering the data of the rest three hospitals, comes to around 33 surgeries per month.

Table 7. Distribution of types of surgeries

	Zonal Hospital	District Hospital
Frequency	6	5
Total Surgeries	11200	1350
Major Surgeries	4480	540
Minor Surgeries	6720	810
LSCS	2350	200
% of LSCS over total surgeries	21%	15%
% of LSCS over major surgeries	53%	37%

The above table demonstrates the classification of the surgeries being performed in the zonal and the district hospitals.

In the six zonal hospitals, over the past year (read 11 months), around 11,200 surgeries were performed out of which around 4,480 were major surgeries while the rest were minor surgeries. Around 2,350 LSCS were performed in the zonal hospitals and the percentage of LSCS over total surgeries is around 21% while the percentage of LSCS over major surgeries comes to around 53%.

In the five district hospitals, over the past year (read 11 months), around 1,350 surgeries were performed out of which around 540 were major surgeries while the rest were minor surgeries. Around 200 LSCS were performed in the district hospitals and the percentage of LSCS over total surgeries is around 15% while the percentage of LSCS over major surgeries comes to around 37%.

The above data is demonstrative of the fact that majority of the surgical services being provided by the hospitals are for Emergency Obstetric Care. Since on average around 40% of the major surgical cases are LSCS cases, the surgical services of the hospitals have made a big impact in reducing maternal and neonatal mortality. Thus it can be inferred that the availability of the services of the AAs, which have enabled the provision of surgical services in most of the hospitals evaluated, has made a positive and significant impact in the reduction of maternal and neonatal mortality.

It is evident from the findings presented above that the provision of surgical services, particularly LSCS, by the district hospitals has made a significant impact in the reduction of maternal and neonatal mortality. Also the provision of life-saving services within the district has also benefited the community and reduced the workload of the regional centers. Also, from the fact that around 40% of the major surgeries performed in the hospitals are LSCS, it can be inferred that there is a great demand for LSCS services in the hospitals and it is essential that these services continue, in view of the lives that are being saved.

Thus the CEOC hospitals visited have the capacity to provide to safe anesthesia services primarily for CEOC cases as is evident by the service statistics and the high level of skills of the AAs in managing spinal and IV anesthesia, which are the main techniques used for LSCS procedure.

Surgeon's opinion on different aspects of AA's services

Due to diverse backgrounds of the doctors conducting surgeries in the hospitals included in the study, the term "surgeon" is loosely used in this report and denotes a doctor who performs surgery in the hospital. The doctor may or may not be a full-fledged surgeon but could also be an obstetrician, gynecologist or MDGP.

AA's services

The surgeons felt that the AAs were skilled in the complete management of anesthesia and management of complications during surgery. Thus they completely entrusted the AAs on anesthesia maintenance during surgery. This could be attributed as a significant achievement of the training.

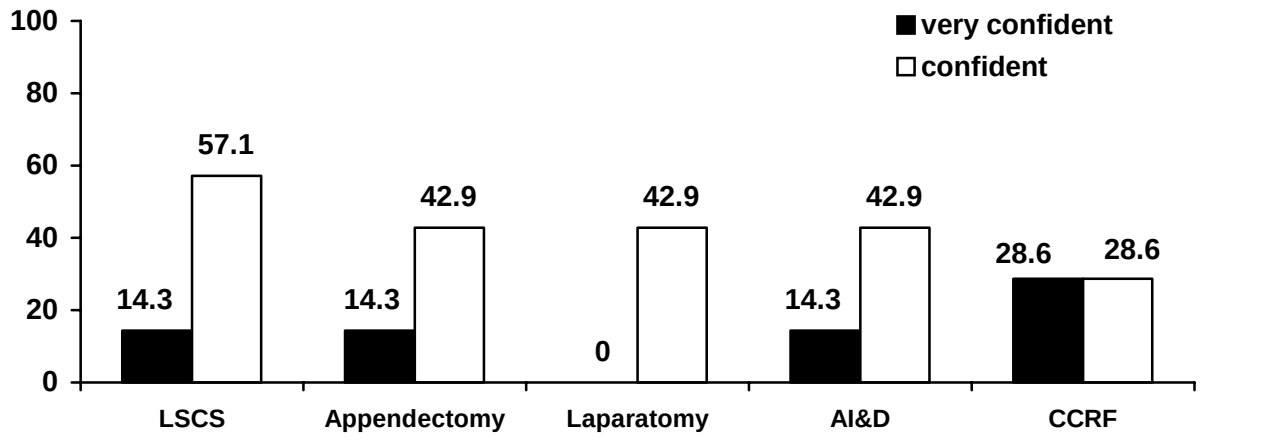
Besides the respondents there were other doctors in the hospitals who also performed surgeries. However, in the absence of doctors, most of the cases were referred to higher centers. In contrast, when the AA was not available, only LSCS was performed in some of the hospitals while in other hospitals all surgeries generally came to a stand still. In some hospitals, MDGPs administered anesthesia for LSCS themselves and also conducted some minor surgeries. Sometimes, for emergency cases and in the absence of AA, some doctors, even those not trained in anesthesia, administered anesthesia with the help of another doctor or the OT nurse. However when the AA was available, 71.4% said that AAs managed all forms of anesthesia, while 28.6% of the surgeons said that anesthesia management was done mutually.

More than half the surgeons (57.1%) were found to be providing surgical services even outside the hospitals. The surgeons were providing services in private clinics and nursing homes. Over 40% of the surgeons were also providing surgical services at various camps organized by the government. Some surgeons performing surgeries outside the hospitals said that they had used the services of the AA in providing spinal and intravenous anesthesia.

As per the surgeons, the AAs were overworked because besides their regular OT duty, they were also being utilized in providing services in the OPD, wards and emergency. They were of the opinion that the AAs were supposed to be dedicated staff of the OT and should not be expected to provide routine services in the ward and OPD. Some surgeons said that sometimes surgeries got delayed because of the absence of the AA from the OT.

According to the surgeons, the AAs were found to be evaluating the patient pre-operatively. However, as most of the cases were emergency cases, the AAs see the patient only in the operation theater. Sometimes they would see the patient one to two hours before the surgery or at most a day before the surgery, in the ward. During pre-operative evaluation, as per the surgeons, the AAs were found to be checking the patients' history and conducting physical check up. Over forty percent (42.9%) of the surgeons informed that AAs visited the patients after surgery mainly in the postoperative ward. Some 28.6% said that AAs tend to visit the patient only when some complications occur. Some surgeons also mentioned that visiting the patients by AAs after surgery was not practiced in their hospitals.

Fig. 9 Surgeon's level of confidence on the skills of AAs



N=7

The surgeons in general seemed to be confident about AAs' abilities to provide anesthesia for different kinds of surgeries. While over 70% of the surgeons were confident on the skills of AAs of providing spinal anesthesia for LSCS, around 55% of surgeons were confident of AAs' skills to provide anesthesia services related to child reduction closed fracture. For laparatomy, only around 43% of the surgeons were confident. It is significant to note that none of the surgeons felt nervous about AAs' skills to provide anesthesia services for the surgeries mentioned above.

Record keeping practices

The practice of record keeping among AAs is not the strongest point. Only some 14.3% of surgeons said that the AAs maintain a logbook. The large majority of the surgeons said that AAs did not maintain a logbook as it was mostly maintained by the doctors themselves or by the OT nurses. Around 60% of the surgeons thought that the AAs were maintaining an anesthetic chart but were not sure. All surgeons said that AAs did write on the patient charts. They recorded the following on the patient's charts:

- type of surgery performed, the procedure adopted and the duration of surgery
- vital records
- anesthesia used

Overall the surgeons respect and appreciate the services provided by the AAs. The surgeons are grateful that they are able to utilize their surgical skills because of the presence of AAs and also feel that more importantly it is the community that is benefiting the most from the services provided.

A mixed response was received from surgeons regarding the record keeping of anesthetic complications. While 42.9% said record was maintained, the same percentage said no such practice existed. Of those maintaining records of anesthetic complications, surgeons informed that detailed record of the cases were not maintained but only what happened was written. Thus in general there is no practice of keeping records of complications and deaths in the hospitals.

Perception of the Peers of AA on different aspect of AA's services

Altogether six peers of AAs were interviewed for this study. The peers were primarily the colleagues of he AAs who worked in the OT.

Anesthesia services as perceived by peers

All six peers were involved in the surgery in their respective hospitals. All peers said that the complete anesthesia services during surgeries were being provided by AAs and the doctors focused on the doing the surgery only. From the reporting of peers, it could be inferred that doctors were quite confident in the abilities of AAs to manage anesthesia services. The peers said that when they themselves were unavailable in the hospital, they felt that there was bound to be adverse effects in the services of the hospital. Their absence would either mean increased workload for the doctor or to the AA. Or at times, operations would be stopped and cases would be referred to higher centers. The peers said that the absence of AA would also make a big difference in the surgical services of the hospital. While for LSCS some peers said that the doctor could give anesthesia, other major surgeries would not be possible without the AA. The increased workload for the doctor would also mean that even some cases would need to be referred. However the peers opined that their own absence from the hospital would have a more significant impact than the absence of the AAs. This suggested that the peers had a higher opinion of their own importance to the surgical services of the hospital than that of AAs.

Of the total peers, 66.7% said that AAs worked outside the OT, within the hospital. They said that the AAs spent on an average about four hours everyday either at OPD, ward or emergency. The peers also mentioned that the AAs were involved in different services outside the hospital. While two peers said that the AAs were providing anesthesia services in a doctor's clinic, one informed that the AA was also managing a pathology lab, while another mentioned that the AA also taught in a CMA campus.

Peers, in general, found the AAs behavior towards the patients to be polite and caring. It can thus be inferred that AAs were friendly towards both the patients as well as other staff working at the hospital.

It was found that time management was not one of the strengths of the AAs. The peers in general felt that 75% of the AAs were not punctual. Similarly, their work was considered to be “not very tidy”.

Perception of the Health Management Committee Members

In an attempt to garner a holistic view of the AA training and anesthesia services provided by the hospitals, five Hospital Management Committee Members have been interviewed.

Of the five Hospital Management Committee Members (HMCM) interviewed, three were found to be highly satisfied with their role as a member of the Hospital Management Committee while the rest two were both satisfied and dissatisfied. Some of the reasons for the satisfaction of the Hospital Management Committee Members were that as members of the hospital management committee they had been able to contribute, in a limited extent, in improving the service delivery mechanisms of the hospital. Some of the achievements mentioned by the Hospital Management Committee Members included construction of buildings in the hospital, establishment of blood bank, etc. Some of the reasons for dissatisfaction were mentioned that as members of the Hospital Management Committee all they were expected to endorse the views of the doctors, and, since the committee was under the regional administrator, it was difficult to work effectively.

All the five HMCMs were knowledgeable about some of the surgeries being performed in the hospital. They were aware that the community was receiving services for both major and minor surgeries in their hospitals. In general, the HMCMs seemed to have a favorable attitude towards the surgery services being provided at their hospitals. One of the HMCMs mentioned that with the support of an external development agency, the quality of service had improved significantly. Special mention was made by one of the leaders that rich patients of the community who were going to higher centers previously for surgical services were now availing the services of the hospital within the district. As regards to the question of satisfaction of the community regarding the services of the hospitals, the HMCMs were of the opinion that the community was also very satisfied as evidenced by the increasing client load in the hospitals. They said that the patients also complemented the hospitals for the improvement in cleanliness and the quality of service.

The HMCMs were aware about the AA training in the sense that they had heard about it and knew that someone from their hospital had been trained and was now providing the anesthesia services. They were of the opinion that the AAs were providing good quality services. Some of the respondents mentioned that surgical services in their health facility were possible only because of the presence of the AA. Another respondent felt that surgeons/doctors workload had been somewhat minimized as a result of AA receiving the training. The HMCMs felt that the presence of the AAs also made it possible for the doctors to provide 24 hours emergency surgical services. Judging by the response of the various HMCMs, they had a favorable impression about AA training as they could observe the positive impact in their health care facilities.

Sixty percent of the HMCMs felt that the local people were receiving round the clock services at their health facility while the remaining felt it was not available mainly due to the shortage of doctors**.** One of the HMCMs mentioned that there was no doctor in the health facility thus effective quality service was out of question.

All the five HMCMs said that they would support His Majesty's Government, if it introduced a policy that Anesthesia Assistants could provide anesthesia services for emergency

surgeries in district hospitals in the absence of Physician Anesthetists. But they felt that AAs should only be created from the Health Assistant and Staff Nurse cadres of health care providers. This strong support of the HMCMs is mainly due to the excellent services currently being provided by the AAs. However, the HMCMs did emphasize that the AAs could not be a replacement for anesthesiologists, whereas they were a stopgap strategy until enough anesthesiologists would be available in the peripheral health institutions of the country.

All the HMCMs were of the opinion that the community had begun to recognize and utilize the CEOC services being provided by the hospital. They felt that communities had realized that the service quality of the hospital had improved, particularly for maternity services. They also mentioned that maternal deaths in the district had gone down since the initiation of provision of LSCS facilities in the hospital. They also mentioned that regular training and monitoring of health care providers had led to an improvement in the service provided by hospitals.

The HMCMs were unanimous on the need to provide AAs with additional training and in providing them with other facilities to increase their knowledge and skills. All HMCMs felt that books, medical journals, internet facilities, discussions with colleagues, participations in seminar/workshops and additional training would significantly contribute to enhancing the knowledge and skills of AAs.

As regards the designation of AAs, the HMCMs felt that a separate post should be created for the paramedics and nurses working in anesthesia and Anesthesia Assistant would be the most appropriate designation for such cadres.

As per some of the HMCMs, extra allowance have been provided to the AAs, and the hospital management committee is also constantly trying to improve the quality of surgical services of the hospitals by requesting for more surgeons and modern equipment. The HMCMs wanted a greater role in decision-making in the hospital management committee.

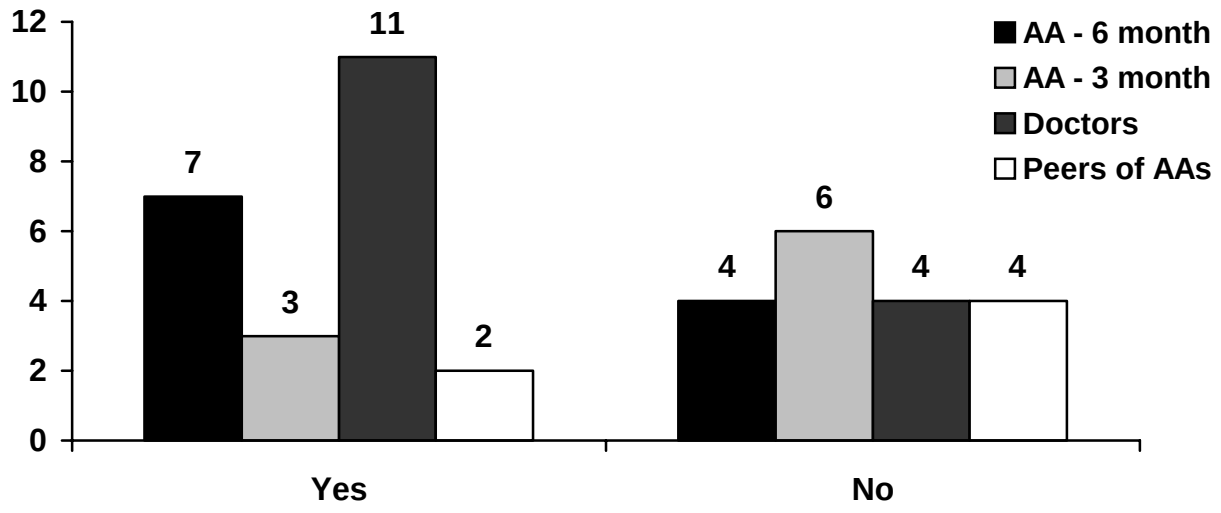
From above it was evident that HMCMs was knowledgeable about AAs training as well as their performance and need. Furthermore, they could perceive the gradual improvement in hospitals and the role they themselves could play in future.

5. General Working Environment, Enabling and Hindering Factors

Job Description and Work

As per the data illustrated below around 54% of all respondents were knowledgeable that they have a job description. However, only two respondents were able to provide copies of their job description. Of the others who were aware, some said that the job description was oral only and not in written form, while others said that they had it somewhere but could not find it now, while some others said that it was at the DHO and not given to them. Some of them had never seen the job description but knew that it existed somewhere. However, most of these respondents felt that the job description of health service providers existed in name only and nobody followed the job description anymore.

Fig. 10. Aware of the existence of a Job Description



As for the six months trained AAs, over 60% knew that they had a job description. But all the AAs were unanimous on the issue that the new work of anesthesia that had been entrusted to them was not in their job description. They were also unanimous in their opinion that since the work in anesthesia was fraught with complications, deaths, and other risks, they needed a job description that explained to them their exact scope of work and their level of responsibility. This was an absolute gray area at present, as none of the AAs were aware of what level of responsibility fell on their shoulders in relation to the risks involved in surgery. It is pertinent to note here that two of the three months trained AAs no longer provide services for routine surgery because they feel that their levels of responsibility is not clear to them and they do not want to be blamed for "anything that goes wrong". They said that they only provided services for spinal anesthesia, that also for emergency cases only and they would continue doing so until they had a Physician Anesthetist working with them as their supervisor. All the other AAs, both three months and six months, however felt that since they received the training, they were supposed to be providing service and they thought that their levels of responsibility and scope of work were being discussed at the bureaucratic circles and would reach them in time. However, the AAs felt that they should be provided with a proper job description to provide safe anesthesia care more effectively. The three three-month trained AAs who are aware of the job description are those who are employed as

Anesthesia Assistants by the respective hospitals on contract basis and feel that the work that they do is specified and clear in their job description.

The doctors were also of the opinion that the government needs to make proper and professional job descriptions for all levels of health service providers. They felt that the line, "Work as instructed by the supervisor", should be deleted from the job description and all work related responsibilities should be clearly outlined for each post. Also in relation to the AA, they emphasized that since surgery was a team responsibility, the lack of the clarity of the functioning of the AAs led to confusion on roles and responsibilities of each member of the surgical team. This was especially important because it was not uncommon for complications and death occur during surgery.

Almost all the respondents (over 90%) felt that their jobs matched with their education and training. However, these respondents also mentioned that they were doing more work than specified in their job description. Also some of the doctors mentioned that their postings in the hospitals did not match with the professional training that they had received. This led to underutilization of their services and some also said that due to this the medical superintendents barred them from providing certain kinds of service. This was particular to some MDGPs and some surgeons who were posted as Medical Officers. Amongst the other respondents, three six months trained AAs were very upset that their knowledge and skills of anesthesia remained unutilized because of the lack of opportunity to participate in surgeries.

The AAs work in other places within the hospital besides managing anesthesia in the operation theater. Some of the AAs are involved in providing services in the OPD, while others provide services in the wards. All the AAs are called to emergency frequently to provide different services ranging from resuscitating seriously ill patients to infusing an IV line on a patient, especially children. One AA also works in the labor room and provides delivery and PAC services.

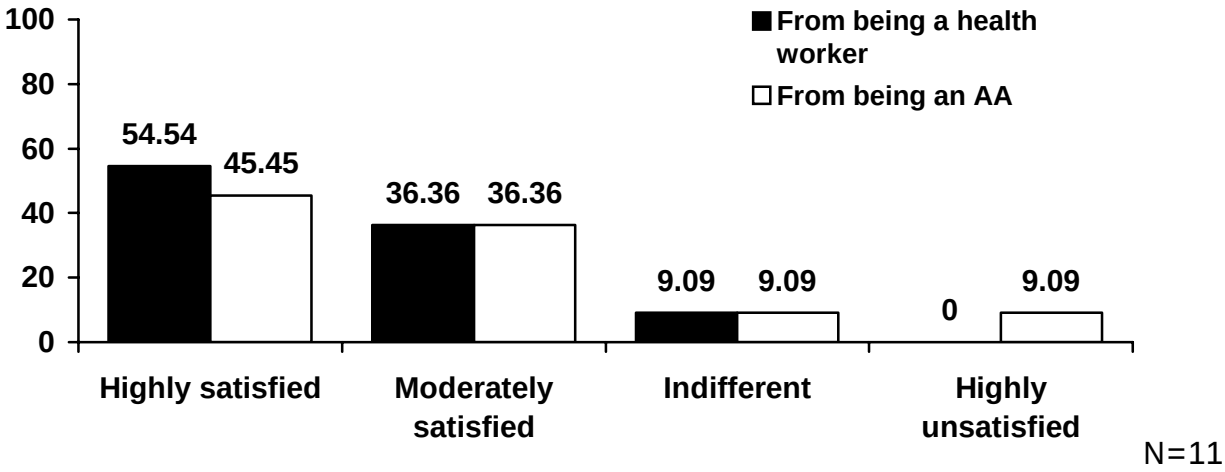
When asked about what happens in the absence AAs from the hospital, it was found that the AAs' absence would severely affect the surgical services of all hospitals. While some hospitals have two Anesthesia Assistants so even when one is on leave the other can fill in, and in some larger hospitals Physician Anesthetists are available. According to the surgeons the absence of AAs takes a major toll on the number and quality of surgical services provided by the hospital. Some of the hospitals will not be able to provide any surgical services at all to the patients. In general, the absence of AAs would create severe problems in managing the surgical services of the hospitals. Some of the words used by the surgeons to describe the state of the hospitals in the absence of AAs are "catastrophic", "unimaginable", "like a fish out of water", etc.

Job Satisfaction

Around 55% of the AAs are highly satisfied from being a health service provider, around 36% were moderately satisfied, while one AA was indifferent. Some of the reasons mentioned for their high or moderate level of satisfaction in being a health service provider are as follows:

- Being able to serve the people of all classes and creed
- Recognized by the society
- Able to utilize skills and knowledge
- Able to work in a free and conducive environment

Fig. 11. Job Satisfaction of AAs



N=11

As regards to their satisfaction in being an anesthesia assistant, the responses were almost the same. However, one AA was highly unsatisfied because s/he was not being able to utilize her skills in anesthesia because of his/her non-involvement in surgery at present. S/he felt that the skills acquired after such a rigorous and expensive training were just going to waste. The AA who was indifferent is also not currently involved in surgeries. The AAs categorized the following as the key reasons for their satisfaction in being an anesthesia assistant:

- Able to contribute in life-saving services
- New area for career enhancement
- Work in anesthesia is exciting
- Very fulfilling to see seriously ill patients getting well after surgery
- Respect and esteem amongst colleagues has increased after receiving training

In general, it was found that almost all the respondents were moderately satisfied, if not highly satisfied, in being a health service provider.

Table 8. AAs perception on surgeons level of confidence while providing service

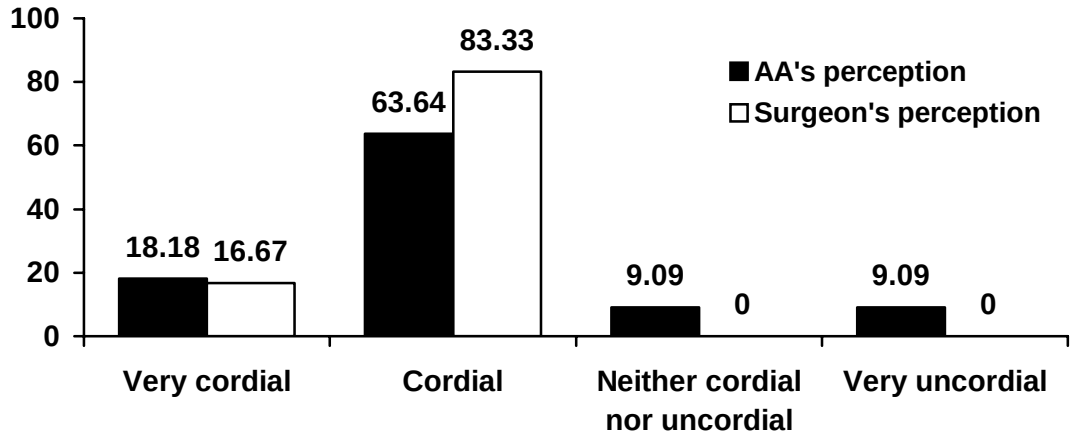
in % (N = 10)

Types of surgery	Very confident	Confident	Nervous	Don't know
LSCS	50	50	0	0
Appendectomy	20	20	20	40
Laparatomy	0	40	40	20
Adult incision and drainage	20	80	0	0
Child's closed reduction fracture	30	50	10	10

According to the AAs, they perceived that the surgeons were either very confident or moderately confident on their abilities to provide anesthesia during LSCS, and, adult incision and drainage as evidenced by over 80% response. For laparatomy related services 40% of the AAs perceived the surgeons to be moderately confident and the same percentage felt that the surgeons were nervous. It was interesting to note that around one fifth of AAs were of the opinion that surgeons were nervous while they were providing anesthesia services for appendectomy and child closed reduction fracture.

AAs relationship with doctors and other colleagues

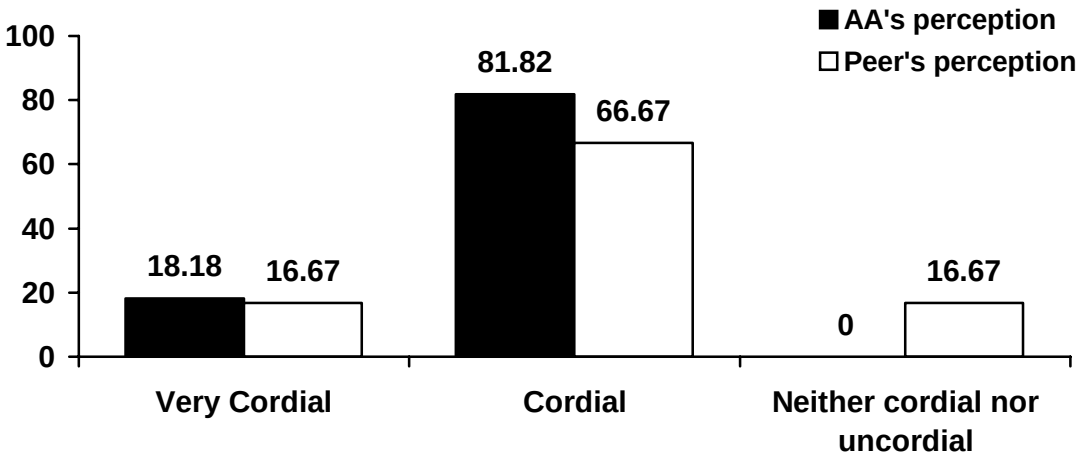
Fig. 12. Working relationship of AAs and surgeons/doctors



N=11

Almost all AAs perceived that they had a good and cordial relationship with doctors and surgeons. While slightly under one fifth (18.18%) considered that they have very cordial relationship with the surgeons, more than 60% felt that the relation was cordial enough. One AA though that his/her working relationship with the doctor was neither cordial nor uncordial while another AA felt that the relationship was very uncordial. The surgeon's perception on the relationship with the AAs is similar to those expressed by the AAs. While over 80% of the doctors feel that their relationship with the AAs is cordial, the rest opined that it was very cordial.

Fig. 13. Working relationship of AAs with peers/colleagues



N=11

All AAs seemed to have cordial relationship with their peers. 66.7% of the peers said felt their working relationship with the AA was cordial, while one peer had a somewhat indifferent relationship with the AA. One peer had very cordial working relationship with the AA. The AAs were perceived to have cordial relationship with other staff of the hospital as well. Large majority of peers (83.3%) felt that AA training had also benefited them. They said that they have learnt additional things from AAs, which has helped them in doing their work. The peers feel that tensions within the OT have reduced because now the patients are receiving proper anesthesia services from the AAs. Some of the peers also mentioned that AAs are also sharing their knowledge with them resulting in enhancing their knowledge and skills.

As per majority of the AAs, it seems that after receiving the training and starting to provide anesthesia service their respect and esteem amongst their colleagues have increased.

Rewards and Opportunities for AAs skill enhancement

Only three out of all the sampled hospitals are providing extra allowances to AAs for their services, while the doctors in most of the hospitals are receiving some allowance for the surgical services that they provide. Some hospitals however, are providing extra allowances to the OT nurses as well. The reason for this difference in allowance provision is said to be because of the official posting of AAs in other places of the hospital and not in the OT. Both the doctors and the AAs feel that the administration should provide equal allowances to both for the surgical services that they have been providing. The Hospital Management Committee Members also share similar opinions as regards to the allowance necessary for the AAs. They have voiced this concern many times in hospital management committee meetings and have even written to the center about it as well. The peers of AAs are also of the opinion that the AAs should receive allowances for the services that they are providing in the OT.

Most of the AAs felt that at present they were receiving no opportunities to enhance their anesthesia skills and knowledge. While one AA said that the surgeon had taken him/her to a bigger hospital for two weeks to observe the surgical services and to learn from the Physician Anesthetist working there, another AA said that the doctors sometimes provide him/her with books on anesthesia, and two AAs have worked with Physician Anesthetists in Government Health Camps. Other than that, no other opportunities have been made available. The AAs feel that they need to receive refresher training regularly in order to update themselves on anesthesia and to reassess and revitalize their skills. The AAs mentioned that medical journals are available in the hospitals but only for doctors. As per the AAs, medical journals, books on anesthesia, participations in workshops and seminars, and, participation in further anesthesia training are opportunities that they think would help them in improving their knowledge and skills in anesthesia. The responses of the AAs on the opportunities required are ranked as following:

1. further training - particularly refresher training
2. books on anesthesia
3. participation in seminars/workshops
4. medical journals

However, as per the AAs, the biggest opportunity in increasing their skills and knowledge on anesthesia is the opportunity to be involved regularly in the surgical services of the hospitals. While three out of the thirteen AAs evaluated are not currently involved in surgeries, majority of the rest were also not providing any anesthesia related services for some time after receiving training. The AAs feel that after receiving training, they should get opportunity to work in providing anesthesia or their skills would wane in time.

This also brings forth another big issue of fear amongst the AAs. What if they are transferred to another hospital where surgical services are not available? The AAs expressed this as being one of their biggest concern because the transfers of employees from one station to another was common in the Nepalese Civil Services, especially in the health sector, and they felt that the government should make a policy of transferring technical staff with certain specific skills only to institutions where those skills can be put to use. The AAs however, do not have a problem being transferred anywhere in the country so long as they get to work in anesthesia. This, they feel, would be a good reward for them, in recognition of their skills and utility.

Workload and number of AAs required

Out of the 11 AAs, close to three fourth (72.7%) felt that judging by the current workload in their facility the current number of AAs is all right. Although in ideal conditions, the appropriate number of AAs required for each hospital would be three, considering the necessity of providing 24 hour services and in order to ensure equal rotational duty amongst the AAs. Judging by the current workload and the increasing trends of surgeries, almost all the respondents were unanimous in their opinion that two AAs per hospital would be adequate to provide the required services.

Designation for AAs

All the respondents of the study were unanimous in their opinion that the AAs required a separate designation and that a separate post should be created with the title of Anesthesia Assistants to work exclusively in the operation theater.

Table 9. Current designation of AAs in the Hospital

N=22

Designation	Frequency	Percentage
Anesthesia Assistant (All Staff Nurse)	3	14.3
Staff nurse	6	27.27
A.N.M	3	13.64
Health Assistant	5	22.73
A.H.W.	5	22.73
Total	22	100

At present only 3 out of the 22 AAs are designated as Anesthesia Assistants. These three have been hired by the hospitals on a contract basis. However all the other health care providers currently working as Anesthesia Assistants are still designated through the post

that they held before receiving training as Anesthesia Assistants and subsequently working in the OT to manage anesthesia during surgery.

The unanimous recommendation of the respondents, as stated earlier, is that the Government should create a separate post of Anesthesia Assistant. This cadre of health care provider should be assigned to work exclusively in OT in managing anesthesia during surgery. However, the current designation of the Anesthesia Assistants should be taken into account while grading them. After creating the Anesthesia Assistant post, the government should also develop methods of monitoring and evaluating their services and instill appropriate promotion and reward mechanisms.

As per the doctors, this would help in institutionalizing the anesthesia assistant training as well and later on the Government can introduce a separate educational stream for such cadre of health care providers. When probed on the issue that their response regarding AAs were that Anesthesia Assistants should just be a short term strategy of the government in fulfilling the current gap of anesthesiologists in the country. The doctors replied that even when anesthesiologists are adequately available in the country, there would be a need for at least two Anesthesia Assistants to help the anesthesiologist in every hospital that provided surgical services.

Anesthesia Equipment and Drugs in the Hospitals

Although most of the hospitals evaluated have the general anesthesia equipment, they do not have adequate equipment to provide the relevant anesthesia services safely. While some of the hospitals have new equipment, most of the hospitals have equipment that are in various stages of deterioration. The EMOs of only three of the hospitals with the six-month AAs are in operable conditions, while in two hospitals they are not usable and one does not have an EMO. Another hospital has a new EMO but certain portions of the EMO are missing. In some hospitals, the AAs are unaware of some of the equipment that they have because the equipment is under the general care of the OT nurse or the storekeeper. While only four hospitals have an oxygen concentrator, in three hospitals they are not working. In some hospitals, the OT has to borrow the oxygen cylinders from the ward when needed because of unavailability of the cylinders in the OT. Though the equipment of most hospitals are old, they are generally kept in clean condition. While most of the hospitals have ETT and connectors, laryngoscope, suction tubes, suction catheters, IV sets, venflome, introducers, and flow meters, many of them do not have child and adult bougies, and, child and adult magill's forceps.

Regarding drugs, most hospitals have the practice of asking the patient to bring the supply of the needed drugs and disposable equipment with them. However, for poor patients some hospitals do provide drugs and equipment from their own stock. Halothane and trilene is not available in any of the hospitals. Re-supply of some essential drugs like ephedrine and mephentamine is a big problem in some hospitals.

In all hospitals the AA manages the drugs and equipment themselves. In general, majority of the AAs reported that they do not have many problems with the equipment and drugs related to anesthesia. But observation revealed that some of the equipment in the hospitals needed to be inspected properly and replenished, if possible.

Enabling Factors

The following were the some enabling factors that motivated the AAs:

- The AAs mentioned that their esteem amongst their colleagues has increased after they received the AA training and started providing anesthesia services.
- The AAs have cordial relations with the doctors and their other colleagues in the hospital and they feel that their colleagues also help them in their work whenever there is a need.
- The health management committee members are very supportive of the services being provided by the AAs.
- The community is utilizing the services of the hospital and trust the capacity of the hospital in providing quality services.
- The doctors find the AAs to be skilled and entrust them with complete responsibilities in managing anesthesia during surgeries.
- The doctors, the peers of the AAs and the HMCMs recognize the contribution of the AAs in improving the services of the hospital.
- The training is directly related to the services that they are providing and has contributed in providing better services. In majority of the cases, the learning acquired from the training is being properly utilized.

Hindering Factors for AAs

The following were the some factors that hindered the performances and functions of the AAs:

- The surgeons are not trusting on the skills of the AAs completely because of the lack of relevant information on the training and the skills acquired by the AAs.
- Lack of adequate anesthesia equipment in the hospitals cause problems in providing safe anesthesia services. Also the skills of the AAs deteriorate over time due to the hindrances in practice brought about the lack of equipment.
- Multiple responsibilities within the hospital means that the AAs are generally overworked and they are overstressed.
- Lack of surgeries in some hospitals is a big hindering factor to the AAs. The AAs feel that their skills is going to waste and their general motivation for other work in the hospital is also low due to this.

- Lack of supervision and monitoring of AAs.
- Lack of opportunities to enhance skills in anesthesia.
- Professional rivalry amongst the doctors in the hospital leading to tension in the hospital environment.
- Lack of clear responsibilities and job description for AAs
- Most of the AAs are not provided with any kind of allowances for the work that they do in the Operation Theater, whereas, in many hospitals, there is a provision to provide such allowances to the doctors the nurses working in the OT.
- The hospitals are found to be at a loss about the roles and responsibilities of the development partners working in the district in providing support to the hospital. This has led to great deal of confusion amongst the hospital staff and also between the district level and central level authorities and amongst the other stakeholders as well.

6. Estimated number of AAs required

As regards to the number of AAs required per hospital, and in order to implement the 15-year National Safe Motherhood Plan (2002-2017) concerning the establishment of functioning CEOC sites in 63 districts by 2017, the numbers of AAs required have been estimated based on the recommendations of the respondents and the current workload of the AAs as evidenced the service statistics.

Of the total 12,550 surgeries performed in 11 hospitals over the period of 11 months between August 2003 and June 2004, around 11,200 surgeries were conducted in zonal hospitals while the district hospitals accounted for the rest 1,350 surgeries. From the table below it is evident that on average each zonal hospital manages on average 170 surgeries every while district hospitals manage around 25 surgeries per month.

Table 10. Number of surgeries conducted over the period August '03 - June '04

Type of Hospital	Frequency	Surgery	Average	Average per month
Zonal	6	11,200	1,867	170
District	5	1,350	270	25*

It is important to note that the average per month is very low as compared to zonal hospitals. This is because, of the five district hospitals whose data have been presented here, one hospital has just started conducting surgeries in June 2004 and in another hospital major surgeries have not been conducted for the past six months. Thus the actual average of the district hospitals, when considering the data of the rest three hospitals, comes to around 33 surgeries per month.

Out of the 11 AAs, close to three fourth (72.7%) felt that judging by the current workload in their facility the current number of AAs is all right. Although in ideal conditions, the appropriate number of AAs required for each hospital would be three, considering the necessity of providing 24 hour services and in order to ensure equal rotational duty amongst the AAs. Judging by the current workload and the increasing trends of surgeries, almost all the respondents were unanimous in their opinion that two AAs per hospital would be adequate to provide the required services.

Based on the service statistics, the zonal hospitals have more surgery caseloads than the district hospitals. Also it is common for zonal hospitals to have more than one Operation Theater. Thus based on the recommendations of the respondents and the service statistics, in order to provide safe anesthesia services for 24-hour emergency services, at least three Anesthesia Assistants in each zonal hospital and two anesthesia assistants in each district hospital are necessary. This will help to ensure that the AAs are not overworked and also the OT duties can be assigned on a rotational basis.

In order to implement the 15-year National Safe Motherhood Plan (2002-2017) of providing CEOC services through 63 district hospitals by 2017, 126 anesthesia assistants need to be trained. 24 anesthesia assistants have been trained so far, of whom two are posted in non-surgery related areas, thus, 104 more anesthesia assistants need to be trained.

C. Conclusions and Discussions

Conclusions

From the findings of the study it can be concluded that the anesthesia assistant training has contributed significantly in enhancing the knowledge and skills of AAs. Furthermore it was found that their significant contribution has been well recognized and accepted by all.

The training, in general, is very well organized and of appropriate duration. The trainers are also highly competent and the materials provided during the training are of high quality and also adequate for distribution except for inadequacy of dolls, dummies and pictures. It has been recommended that the training materials be translated to Nepali and that the trainers use Nepali as the principal language of training to ensure better comprehension of the subject by the trainees. The theory portion was found to be difficult to comprehend, as it was dealt during the beginning of the course.

Surgeons and peers appreciated the training of AAs, as there was visible change in the performance of AAs in the O.T. after the training. But the surgeons, who made use of the skills of AAs, did not have much idea about the content of the course and the skills gained by the AAs.

The impact of the training was found to be very positive as surgeries were being performed regularly in most of the hospitals where the trainees are posted. The surgeons in these hospitals entrust the trainees with the complete management of anesthesia thus signaling the trust that the surgeons have endowed on the skills of the trainees.

Referrals from these hospitals to higher centers have declined to a large extent, especially for delivery related cases because most of the hospitals provide LSCS services. In turn, referrals from other centers to the hospitals for different services, particularly for CEOC services have increased and are gradually increasing.

While the AAs could manage anesthesia in the OT, their role in pre-operative and post-operative periods were found to be limited. Also, since around 40% of the major surgeries being performed in the hospitals were LSCS, the availability of AAs and the services they provide have had a major impact in reducing maternal and neonatal mortality.

After the 6 months training, the AAs have not received any opportunities to refresh and update their skills. There were no follow-ups of the training in the form of supervisory visit, continuing education or on-the-job training from physician anesthetists.

Overall, the six months anesthesia assistant training is found to be very good and has had a major impact on the CEOC services being provided by the hospitals sampled in the study. However, certain additional topics need to be included to make the training very useful as well as broaden the scope of service. The 6-month AA training needs to be institutionalized in order to ensure that the trained AAs are monitored well and for the training to have a lasting impact on the surgical services of the hospitals of Nepal.

Discussions

Institutionalization of the AA training

As regards the institutionalization of the AA training, the study team felt that it is important for better management of the training and in order to make the training more sustainable. The study team ideates the following in relation to the institutionalization of the training:

Currently the training is being managed by Patan Hospital and there are only two training sites: one is Patan Hospital itself and the other is Tansen Hospital. The National Health Training Center needs to develop more training sites in order to ensure that the number of anesthesia assistants required to implement the National 15-year Safe Motherhood Plan are trained and made available for service, on time. However, specific criteria should be developed first in order for the hospitals to qualify as a training site. Also, a team of trainers needs to be prepared so that the trainers are thoroughly conversant with the course and the method of teaching.

A central training site needs to be selected in order for the management of the training course, the training site and the trainers. This could be selected from amongst some of the principal tertiary hospitals of the country like Bir Hospital, Patan Hospital, Teaching Hospital, etc.

Regional hospitals can be developed as training sites for the training. Since most of the regional hospitals have a specialist anesthesiologist who can be trained to be the trainers. These regional hospitals would be Koshi Zonal Hospital in the East, Narayani Sub-Regional Hospital in the Center, Pokhara Western Regional Hospital in the West, and Bheri Zonal Hospital in the Mid-West.

The development of these training sites would mean that the required anesthesia assistants for the region could be trained in the region itself. This would contribute in making the training more cost-effective and efficient. It would also allow the trainers to have an easier access with the trainees in monitoring their work and providing refresher trainings. The networks of AAs with specialist anesthetists, mentioned in the recommendation, can also be established accordingly through the regional sites.

Selection of trainees for future training

It was observed during the study that the Health Assistants and Staff Nurses who were working as AAs were more confident in providing the services than the AAs with lower levels of qualifications. Also the ANMs and AHWs regarded the technical level of the training to be far more complex and complicated that the HAs and the SNs did. Thus, it is recommended that only HAs and SNs be selected to attend the training in the future.

This was a criteria established during the process of the development of the training, however, since there is a shortage of such human resources in the country, in the past, AHWs and ANMs had to be selected for the training. Such situations may arise in the future also. Some 50 health service providers have already received the three-month AA

training organized by Bir Hospital. These health service providers may also be selected for the training irrespective of their educational background, owing to the fact that they have already been exposed to some form of anesthesia training and provision of anesthesia services in the past.

Another issue that the evaluation team observed was that some of the trained AAs were not involved in any kinds of anesthesia service provision. This indicates a huge waste of the resources that were invested in training these people. In the future, the capacity of the hospital and the willingness of the doctors of the hospital in providing surgical services, etc. need to be examined before selecting a candidate for training from the particular hospital. Also, it needs to be ascertained whether the equipment needed for providing the services can be made available in the hospital by the time the AA completes the training.

Criteria for evaluation of competence of trainees

It was observed that the participants of the training are evaluated three times within their training period to assess the differences in the level of their knowledge regarding anesthesia. However, currently no criteria exist that qualifies a trainee to be labeled competent or incompetent, after completing the training. It was observed that all trainees, irrespective of the scores that they scored in the tests administered at the completion of the training, were categorized as having completed the training competently. Also the levels of their skills are not properly evaluated, thereby giving no information on the clinical competence of the trainees.

The AA training is not an idea-based training similar to behavioral issues like counseling, etc. This is a clinical training where a trainee has to complete the training either as competent in providing services, or, as an incompetent, who should not be allowed to provide service until s/he fulfils the criteria of being competent. Since the training course is a key technical issue of service provision and is directly associated with life and death situations of patients, such criteria, which enables trainers to assess whether a trainee has passed the training successfully or not, is absolutely essential. The absence of such criteria may create problems of having incompetent service providers involved in surgeries, thereby damaging the surgical services of the country and putting the lives of many patients at risk.

AA training and provision of services

It was observed that majority of the AAs are not providing GA services or at best it is very infrequent. Hence it would not be incorrect to assume that the skills of the AAs in providing these services will gradually decline. More thoughts need to be applied to this issue of GA services. Either, the GA services need to be withdrawn from the training and just spinal and IVA anesthesia techniques along with emergency intubation should be taught or the AAs need to be involved more in providing GA services so that they retain their skills.

Alternatively, the training course can be modified to include GA content for those AAs who have the equipment for providing GA and who are also likely to be providing GA services

frequently after they finish the training. It was observed that the AAs most involved in providing GA were those working in zonal hospitals. The AAs working in the district hospitals were providing GA service very infrequently or not at all. Thus, it may be necessary that training on GA be provided to the trainees from zonal hospitals only. This issue again solicits the importance of understanding by the trainers, the capacity of the hospitals from where the trainees are coming and the environment in which they will be providing anesthesia services.

The doctors of the hospitals from where the AAs are trained also need to be properly briefed on the training and the competence of the trainees, with whom they will be forming the surgical team. One of the ways of doing this would be to conducting orientation of one-two days for the doctors in the training sites during the end of the training course.

Concluding Remarks

As per the current human resource situation in the Health Services Sector of Nepal, the AAs seem to be contributing significantly in saving the lives of the poor and needy, especially for CEOC services. It needs to be understood that this cadre of health workers are not replacements for specialist anesthetists but are fulfilling a shorter term strategy in providing life-saving services to the needy people in distant and remote places. The longer term strategy is still that enough specialists are developed who can provide these services in a more complete, consistent and competent manner. In a country where there are very few specialist anesthetists, efforts need to be concentrated in developing these kinds of specialists. However, even when the specialists are available in sufficient numbers, they will still require the support and help of the AAs in managing the anesthesia services during surgery.

D. Recommendations

Training

- The training needs to be institutionalized and conducted in Nepali.
- The training materials should be translated to Nepali.
- Theory portion should be taught slowly along side the practical.
- There needs to be more sessions during the training that allows the trainees to observe the anesthesia services being provided by other service providers.
- Adequate dummies, dolls and pictures should be provided so that the trainee can learn effectively.
- The trainer or another resource person should facilitate the transition of each trainee into his/her institution from training to service provision so as to ensure that the knowledge and skills acquired are actually translated into practice.
- The surgeons working with the AAs should be updated on the content of the training and the skills of the AAs so that they understand the kinds of services that the AAs are able to provide.
- The AAs should be periodically supported with resource materials and further training opportunities so as to maintain and enhance their skills.
- The training needs to incorporate a topic on basic maintenance of anesthesia equipment.
- The anesthesia charts provided during training needs to be consistent with the standard anesthesia charts supplied by the Government to the hospitals.
- The trainers should analyze or request information about the setting of OT of trainee's hospital before the training so that the trainee is made aware of the kinds of equipment that s/he will have to work with and that s/he becomes capable of maintaining those equipment and providing the anesthesia services through those equipment proficiently.

Administration

- All equipment should be checked for completeness before sending to the hospitals.
- Judging by the current workload and the realities, at least two AAs are necessary per institution.
- Attraction allowances should be provided uniformly to AAs as is provided to Surgeons and Physician Anesthetists, and the OT nurses, in some cases.

- The job description of the AAs needs to be developed and their level of responsibility clearly spelt out. Also the job descriptions of all levels of health service providers needs to be made professional and more importantly, available.

- Record keeping of complications and surgery related data is weak and this practice needs to be started.

- The AAs should continue the practice of maintaining anesthesia charts. The administration needs to provide the AA with the charts that they are comfortable in maintaining.

- Since the AAs are generally on-call in the hospital, it would be appropriate to allot residential facilities for the AAs in the hospital quarters.

- The AAs need regular refresher training in order to maintain and enhance their levels of skills and also to learn new things on anesthesia.

Policy

- HMG needs to introduce a separate position of Anesthesia Assistants in the health system. This position should be created with the view of using the AAs exclusively in the OT for anesthesia management purposes. A reward and promotion mechanism should also be worked out.

- A system of network should be developed between the AAs and Physician Anesthetists working closest to their hospital so that they can update themselves and learn from the PAs. These Physician Anesthetists can be valuable resource persons for the AAs.

- The job descriptions of the health service providers needs to be revamped and made more professional.

- The HMIS needs to include more information on the categories of surgical services and on issues related to surgery.

E. Appendix

1. Structured IDI Questionnaire for AA

A. Personal Characteristics

Name of District:				
Name of Health Institution				
Name:		Age:		
Education Qualification:		Marital Status:		
Types of training received (last 5 years):				
1.				
2.				
3.				
4.				
Name of Health Facilities posted to in the past (last 4 postings):				
1.				
2.				
3.				
4.				
Current designation at the hospital:				
Total years of service:				
How long posted in current hospital:				
Home address:				
Native place:				
Income level:	Less than 100,000	100,000 – 150,000	150,000 – 200,000	More than 200,000

B. General - Job description and Job satisfaction:

S.N.	Questions	Skip pattern
101.	Why did you become a health service provider?	
102.	Do you know that you have a job description? Yes – ask for a copy. No	
103.	Is the job that you are currently doing consistent with the education and the training that you have received? Yes – Probe how No – Probe why	
104.	Please explain the level of satisfaction in being a health service provider? (Probe for qualitative statements.) Very satisfied Moderately satisfied Neutral Moderately dissatisfied Very dissatisfied	

C. AA training:

S.N.	Questions	Skip pattern
105.	What is your opinion of the anesthesia assistant training? Probe for quality of the training and the relevance of the training to their jobs. Probe for their level of satisfaction.	

106.	What is your level of satisfaction in relation to the training? (Probe for qualitative statements.) Highly satisfied Moderately satisfied Neutral Moderately dissatisfied Highly dissatisfied	
107.	Was the training residential or otherwise? Residential Non-residential	
108.	Did you face any kinds of problems during the training? Yes No (Probe for logistics, comprehension, and other problems as mentioned.)	
109.	What was the quality of the Theory portion of the training? Excellent Average Poor Don't know	
110.	What was the quality of the Practical portion of the training? Excellent Average Poor Don't know	
111.	What was the quality of the Operation Theatre experience? Excellent Average Poor Don't know	
112.	Were you interacting with patients during the training? Yes No	If no skip to 116
113.	Did you feel that you were exposed to enough patients during the training to learn adequately? Yes No – Probe why	
114.	Were you satisfied with the trainers of the training? Highly satisfied Moderately satisfied Neutral Moderately dissatisfied Highly dissatisfied (Probe for competence of trainers as well as communication skills.)	
115.	What is your impression of the course materials provided to you during the training? Good Average Poor (Probe for relevance of materials and skill enhancement due to the materials.)	
116.	Were the materials adequate? Yes No – Why	
117.	Did you have any problems in understanding the materials? Yes No (Probe for language of the materials as well as technical content.)	

118.	Did you face any problems with the language the training was based in? Yes No – Probe why	
119.	What are your views about the duration of the training – 6 months? Too short (Probe for what should be added) Just right Too long (Probe for what should be deleted) Don't know (Probe why)	
120.	How did the AA training compare with the other training that you have received so far?	
121.	What is your impression on the technical level of the training? Too complicated (Probe why) The right level (Probe why) Too easy (Probe why)	
122.	What are your recommendations to make the training more effective?	
123.	Have you received any refresher training on anesthesia services? Yes No	If no skip to 126
124.	If yes, what was the training? Where did you receive it? When did you receive it?	
125.	Have you received any support visits at your workplace? Yes No	If no skip to 128
126.	If yes, who visited? Physician Anesthetist When Trainer: When Others: When	
127.	Have you visited other hospitals to observe anesthesia services? Yes – When and Where No	
128.	Immediately after you finished your training, how did you feel about providing anesthesia services in your hospital? Very confident Fairly confident No difference Not very confident Very anxious/nervous	
129.	Were there any cases/problems that you felt you were not ready to manage? Yes – Probe type of cases and why. No	If no skip to 132
130.	If yes, How did you tackle the problem?	
131.	Were there any cases that you felt you handled fairly well because of the training? Explain.	
132.	How do you feel now in providing anesthesia services? Very confident Fairly confident No difference Not very confident Very anxious/nervous	
133.	If very confident or fairly confident: Please tell us about any cases that you feel unable to manage now? Explain.	
134.	What kind of other training support do you require in the future?	
135.	In your opinion what is the impact of this training on the services of your hospital?	

D. Anesthesia services:

S.N.	Questions	Skip pattern
136.	Are you involved in the operations performed in your hospital? Yes No – Probe why.	If no skip to 141
137.	From when have you been involved in the operations? Right after receiving training After certain period (ask for date) _____	
138.	How actually are you involved in the operations? (Probe for role. Probe for anesthesia services.)	
139.	Are you always involved in surgeries? Yes No – Probe why.	
140.	Is there any fixed time allotted for surgeries? If yes note time. (Probe for routine surgery and emergency. Note both times if different for the two.)	
141.	How many days a week are there surgeries? (Probe for routine and emergency.)	
142.	How many surgeries were conducted in the last month? Of them how many were caesarean sections? (Note number)	
143.	Do you work in other places within the hospital? Yes No	If no skip to 147
144.	Where do you work? (Probe for amount of time spent.)	
145.	What kinds of services do you provide?	
146.	Do you provide anesthesia services outside the hospital? Yes No	If no skip to 153
147.	Where do you provide services outside the hospital?	
148.	What kinds of services do you provide?	
149.	If AA provides surgical services outside the hospital: How many surgeries were conducted in the last month? Of them how many were caesarean sections? (Note number)	
150.	How often do you provide services outside the hospital?	
151.	Are these outside services available for all kinds of patients? Yes No Probe for types of patients serviced? Probe for VIPs.	
152.	What happens to the surgical services of the hospital when you are not available in the hospital? (Probe for leave or absences.)	
153.	What happens when the surgeon is not present? (Probe for referral and where patients are referred. Probe for life or death situation.)	
154.	What happens when there is an emergency and you or another anesthesia assistant is not present?	
155.	Do you provide resuscitation services? Yes No	If no skip to 158
156.	For whom do you provide resuscitation services? Seriously ill patients Neonates Post-op cases Ward cases Emergency cases	
157.	Have you faced any complications while providing anesthesia services? Yes – Probe for types of complications and management.	

	No	
158.	Do you see the patient before surgery? Yes No – Probe why.	If no skip to 162
159.	If yes, where and when do you see the patient?	
160.	If yes, what do you do? Take history Examine the patient Perform or request investigations Review investigations	
161.	Do you see the patient after surgery? Yes No – Probe why.	If no skip to 165
162.	If yes, where and when do you see the patient?	
163.	If yes, what do you do? Check Oxygen Check BP Check Fluids Check Analgesia problems Provide instructions (Probe for written or oral)	
164.	Please tell us about some of the post-operative complications that you have faced? (Probe for type of complications. Probe for management of complications.)	
165.	What anesthesia technique do you use for the following: LSCS: Appendix Laparatomy Incision and Drainage in adult Reduction closed fracture in child	
166.	How do you think the surgeon feels when you provide anesthesia services for the following: Adult Incision+Drainage: Very relaxed, relaxed, anxious/nervous Child closed fracture: Very relaxed, relaxed, anxious/nervous Appendix: Very relaxed, relaxed, anxious/nervous LSCS: Very relaxed, relaxed, anxious/nervous Laparatomy: Very relaxed, relaxed, anxious/nervous GA with intubation & paralysis: Very relaxed, relaxed, anxious/nervous	
167.	Have you ever used General Anesthesia for LSCS? Yes – Probe for number of cases and outcome. No	
168.	How long does it take to do an LSCS from IV to wake up?	
169.	What is the local practice for antacid prophylaxis?	
170.	What is the practice for manual removal of placenta?	
171.	Have you faced a situation where you were confident to anesthetize but the surgeon was not confident to operate? Yes - (Probe - What did you do? What happens in such cases?) No	
172.	Have you faced a situation where the surgeon was confident to operate but you were not confident to anesthetize? Yes - (Probe - What did you do? What happens in such cases?) No	

E. Record-keeping:

S.N.	Questions	Skip pattern

173.	Do you maintain a logbook? Yes – Ask for a copy and photocopy No – Probe why	
174.	Do you make an anesthetic chart? Yes – Ask for a copy and photocopy No – Probe why.	
175.	Does your hospital keep a record of the complications? Yes – Ask for a copy and photocopy No – Probe why.	
176.	Do you write in the patients' records? Yes – Ask for a copy and photocopy No – Probe why.	If no skip to section F
177.	If yes, when do you write in the patients' records? Before surgery After surgery Both	
178.	If yes, what do you write?	

F. Work/Professional life:

S.N.	Questions	Skip pattern
179.	What kind of working relationship did you have with the doctor/ surgeon? Very cordial Cordial Neither cordial nor uncordial Uncordial Very uncordial	
180.	How much responsibility does s/he entrust you with?	
181.	What do you think of the level of confidence of the surgeon in you and your skills? Very confident with me Confident with me Not confident with me Don't know	
182.	How is your relation with the other staff of the hospital? (Probe why for all.) Very cordial Cordial Neither cordial nor uncordial Uncordial Very uncordial	
183.	What do you think is your esteem among your colleagues, after you started providing anesthesia services? Higher Same Lower	
184.	Please explain the level of satisfaction in being an anesthesia assistant? (Probe for qualitative statements.) Very satisfied Moderately satisfied Neutral Moderately dissatisfied Very dissatisfied	
185.	What opportunities do you have for enhancing your anesthesia skills?	
186.	What kinds of resources would you like to have to improve your skills? Books	

	Medical journals Access to internet information Colleagues to discuss work issues with Attending seminars/workshops Further training opportunities	
187.	What are your views on the number of anesthesia providers needed for your hospital? Adequate Inadequate Don't know If adequate or inadequate, Probe for explanation and justification.	
188.	Are you a local to the hospital? Yes No	If no skip to 191
189.	If yes, how has your being a local helped you in providing service?	
190.	If no, what kind of problems does this create.	
191.	What kind of support do you need from the hospital, the DHO and the staff in general?	
192.	What could/should the HMG do for you now?	
193.	What support have you already received?	
194.	Would you feel comfortable being transferred to some other hospital? Yes No Probe for why	
195.	Do you want a separate professional title for yourself and people like you who are providing anesthesia services? Yes No	If no skip to question 199
196.	What title do you want?	
197.	What are your career plans?	

2. Structured Test Questionnaire for AA

Mark the answers either T for an answer that you think is true; F for an answer you think is false. If you leave it blank then you have not answered the question. If you do not know the answer but have an idea then you may try to answer. Please do not answer when you have no idea i.e. do not make a complete guess.

A correct answer scores 1 mark
If you leave it blank then you will score no marks

	T / F
1) A 65 year old man with bowel obstruction for Laparatomy for surgery	
a) may be induced with ketamine to maintain the BP	
b) needs thiopentone 7mg/kg for induction	
c) should have a urinary catheter early to aid resuscitation	
d) may be very dehydrated	
e) should have a CXR and ECG	
2) The following may cause hypotension under GA anesthesia	
a) deep anesthesia with halothane	
b) hypercapnia	
c) pneumothorax	
d) allergic reaction	
e) hypovolaemia	
3) Using ether for GA	
a) the pulse and BP usually fall from awake values	
b) you must use tearing and sweating to asses depth of anesthesia	
c) should be turned off after surgery has finished because it wears off quickly	
d) if the patient is light at 3% you should just turn the ether up to 4%	
e) surgeon must not use Lignocaine with adrenaline because of the risk of arrhythmias	
4) When you perform spinal anesthesia	
a) you must NEVER put the patient head down	
b) after approximately 20 minutes the LA does not move (is fixed)	
c) you can test with “cold” (or needles prick)	
d) all patients should be tilted to the left	
e) it can be useful to give IV diclofenac at the end of the procedure	

5) When you use opioids for analgesia	
a) dose of pethidine is 1mg/kg IM	
b) you should not use any other analgesics	
c) they should be used for major surgery	
d) they can reduce the raised BP that happens with intubation	
e) the patient may get respiratory depression	
6) A women with a large ante-partum hemorrhage for LSCS	
a) should be fully resuscitated before undergoing surgery	
b) should have a GA	
c) can have metoclopramide 10mg IV and ranitidine 50mg IV before LSCS	
d) needs 2 large IV drips	
e) only needs blood grouping before theatre	
7) Intraoperative fluids	
a) adults require 1½ mls/kg/hr for maintenance	
b) laparatomy patients need an additional 5 to 10 mls/kg/hour of fluid	
c) ALL adults can lose 20% of their blood volume before they need transfusion	
d) monitoring urine output can be useful to assess needs	
e) it is best to use normal saline (not dextrose 5%) when replacing blood loss	
8) The intubation may be difficult if the patient	
a) has an old burn on the neck and face	
b) is full-term pregnant	
c) has a large chin	
d) is a large man with a big head and short neck	
e) has some missing and loose teeth	
9) Patients should only leave recovery when	
a) pain is reasonably controlled	
b) they have passed urine	
c) the spinal block is below the level L1	
d) any post-operative nausea or vomiting is controlled	
e) any ongoing bleeding has stopped	

10) IVA	
a) There are risks if you use this for manual removal of placenta	
b) You do not need to starve the patient	
c) It is safer to use ketamine alone (not combined with thiopentone)	
d) Requires no assistance or monitoring	
e) The anesthesia can be extended with gases, thiopentone or ketamine	
11) Halothane	
a) can be used in doses of 2% without problems for LSCS	
b) is expensive	
c) is used in doses of about 1% for a ventilated patient	
d) is a good analgesic	
e) can cause dangerous falls in the BP if it is not used carefully	
12) If the patent becomes hypoxic during the anesthetic it might be because	
a) the circuit is disconnected	
b) the oxygen cylinder is empty	
c) of a patient pathology	
d) you are not ventilating the patient enough	
e) the ETT has moved down the right main bronchus	
13) The following measurements are approximately correct for an average Nepali woman	
a) 7mm ETT	
b) size 3 laryngoscope blade	
c) Blood volume of 6 liters	
d) ETT measures 26 cms to the teeth	
e) Body weight of 50 kg	
14) When you do a spinal anesthetic	
a) you must have everything ready for intubation also	
b) you must give 100ml of IV fluid before you start (preload)	
c) plain (not hyperbaric / heavy) is most reliable	
d) you must be kind to your patient	
e) to put the needle in at any level below T10 is OK	

15) Pregnant women	
a) have a larger blood volume than non-pregnant women	
b) breathe slower	
c) should have a wedge placed under the right hip when supine	
d) are at risk of aspiration when they are anesthetized	
e) can develop hypotension when they lay on their backs	
16) When you prepare for intubation	
a) you must have 2 laryngoscopes	
b) a bougie and/or a stylet may be helpful	
c) only 1 ETT is needed	
d) the patient should lay with his head flat on the table	
e) a "tipping table" is needed	
17) These are true definitions	
a) hypotension is a systolic BP less than 100	
b) bradycardia is a heart rate less than 80 bpm.	
c) hypoxaemia is low oxygen in the blood	
d) hypercapnia is a high blood level of CO2	
e) hypotension is when the systolic BP falls by more than 25%	
18) Under relaxant GA, I know my patient is asleep because	
a) the pulse and blood pressure are normal	
b) his pupils are large and point in different directions	
c) he is sweating and tears are coming from his eyes	
d) he does not move	
e) the surgeon is not complaining	
19) Thiopentone	
a) is an induction agent	
b) provides analgesia	
c) causes the blood pressure to rise	
d) will last for more than 30 minutes	
e) can be mixed with ketamine without a problem	

20) These statements are true	
a) 1% ether is as powerful as 1% halothane	
b) cleaning equipment is not the same as sterilizing it	
c) patients who are scared and difficult should be treated roughly	
d) you do not need to check a diabetics blood sugar when he is anesthetized	
e) it is impossible to get TB from dirty anesthetic equipment	

3. Skill Assessment Checklist for AA

Based on the Learning guide from the training manual, observe with a patient. If no patient available by the second day then test using role-play with a Volunteer and Spinal and Intubation dummies. Assessor to encourage fully realistic role-play. Proceed in the following manner:

1. Setting up OT - All candidates
2. Prepare patient - All, with either patient or volunteer
3. IV infusion - Only if patient
4. Bag + Mask - All. Patient or Intubation trainer
5. Intubation - All. Patient or Intubation trainer
6. Spinal anesthesia - All. Patient or Volunteer & Spinal trainer
7. General anesthesia - Only if seen with patient

Score as per the following:

P = Poor. Step or task not performed correctly or out of sequence (if important) or is omitted.

M = Moderately well performed. Step or task performed correctly in proper sequence (if important) but participant does not progress from step to step efficiently. Needs supervisor nearby.

G = Good performance. Step or task efficiently and precisely performed in the proper sequence (if important). Can function independently.

The candidate does not have to complete these steps in any particular order. Watch carefully as some of the steps may be done simultaneously.

S.N.	Step/Task	P	M	G	Notes (Prompts)
I	**SETTING UP THEATRE**				
1.	**CONSTRUCT THE CIRCUIT**				Assessor disconnects all of circuit (O2 lines etc.) and leaves parts on the table, including magnet separate from OIB. Ask the candidate: You have just arrived back from your training and are setting up the OT for the first time. Please fully prepare the operating theatre for any form of emergency anesthesia. Include anything you may need for a GA or Spinal for an adult patient who may not be starved.
a	Collect all components of the drawover apparatus (anti-static tubing with connector pieces, face masks (size 3 and 4), x2 OMV vaporizers, valve, tubing from oxygen supply, oxygen inlet connector and OIB plus magnet.				
b	Inspect the equipment to ensure that it is clean and dry				
c	Check the tubing connectors are well fitting				
d	Inspect the valve to see that both leaflets are in place				
e	Fix the magnet over the patient-end valve of the OIB				
f	Ensure that the OMV levers move freely				
g	Identify the flow direction of the 2 OMVs and connect together so direction is same for both - halothane upstream				
h	Attach the oxygen inlet connector directly upstream to the halothane OMV				
i	Attach the oxygen reservoir tubing and oxygen supply tubing to the oxygen inlet connector				
j	Attach tubing between trilene vaporizer (upstream) and OIB (downstream)				

k	Connect 1m anti-static hose to patient-end of OIB				
l	Attach inlet part of patient valve to this 1m tubing, above				
m	Attach oxygen supply tubing to oxygen supply				
n	Check and tighten all connections				
o	Check the vaporizers contain anesthetic agents				
2	**CHECK CIRCUIT FUNCTIONS CORRECTLY**				
a	Inflate and deflate OIB- action should be easy - feel air expelled via the patient port of the valve				
b	Occlude the patient port of the valve - depression of the OIB should be impossible				
c	Occlude the oxygen reservoir tubing and attempt to inflate the OIB - bellows should only rise with difficulty				
d	Connect the face mask to the expiratory port of patient valve				
3	**PREPARING THE OXYGEN SUPPLY**				
a	Connect oxygen tubing to the outlet of the oxygen concentrator, if available				
b	Plug in and turn on the oxygen concentrator				
c	Ensure output from oxygen concentrator at 2 and 6 l/min				
	AND,				
d	Connect oxygen tubing to the outlet of the oxygen cylinder				
e	Make sure the oxygen rotameter is turned off				
f	Open the oxygen cylinder				
g	Look at the pressure gauge to check that there is oxygen left in the cylinder				
h	Open the rotameters to ensure oxygen can be supplied, then close again				
4	**PREPARE SUCTION APPARATUS**				
a	Collect suction apparatus, tubing and suction/ Yankauer suckers				
b	Connect tubing and catheter/Yankauer				
c	Ensure it reaches the patient's head				
d	Plug in and turn on				
e	Check for good suction				
5	**CHECK OPERATING TABLE FOR HEAD DOWN AND LEFT LATERAL TILT**				
6	**PREPARE FOR BAG & MASK VENTILATION**				

a	Collect the correct sized equipment (SIB, masks, airways)				
7	**PREPARE FOR INTUBATION**				
a	Collect appropriate sized ETTs, x2 laryngoscopes, Magill's forceps, tape, air syringe, intubation tray, stylet and a tray for used equipment, Stethoscope				
b	Collect and check the SIB				
c	Check the ETT cuffs and deflate fully				
d	Check the laryngoscopes function correctly				
e	Insert the stylet into an ETT and fix so that the end of the stylet remains in the ETT near its end				
f	Put the ETT with stylet, syringe and 1 laryngoscope into the intubation tray				
8	**PREPARE IV FLUIDS**				
a	Collect necessary equipment (cannula, alcohol swab, infusion set, IV fluid, drip stand, tourniquet and tape)				
b	Choose appropriate sized cannula				
c	Select the appropriate infusion fluid				
9	**PREPARE ANAESTHETIC DRUGS**				i) Are you prepared for paralysis and reversal (If Panc Neo forgotten) ii) Are you prepared for sedation & analgesia iii) Are you ready for LSCS (if spinal set forgotten)
a	Draw up atropine 0.6 mg and suxamethonium 100 mg into labeled syringes and have available adrenaline 10 mls of 1:10,000				
b	Have ready other anesthetic drugs – thiopentone, ketamine, ephedrine or mephentamine, diazepam, analgesic, Pancuronium neostigmine				
c	Collect an adequate supply of needles and syringes				
d	Collect bins for rubbish and for "sharps"				
e	Collect spinal anesthesia set				
10	**PREPARE MONITORS (SCORE OVERALL)**				
a	Collect manual BP and Stethoscope				
b	Collect ECG electrodes, tape, scissors				
c	Plug in and switch on all available monitors – check it is running on mains electricity				
d	Check patient leads are inserted into the monitor				
e	Ensure patient leads will reach to the patient				
f	Adjust the alarm settings and switch on alarms				
g	Check the pulse oximeter reads on your finger				
h	Check the arrangement of monitors + equipment to facilitate working environment				

S.N.	Step/Task	P	M	G	Note
II	**PREPARATION OF PATIENT**				If role-play: Now your OT is ready. A patient is listed for LSCS. Show me everything you would do to fully prepare this patient for surgery.
1	**Preoperatively assess the patient** (relevant to anesthesia) (Outside OT, Yes / No ?)				
a	Can relate relevant points in the patient's history (Previous GA with/without problems, Other illness, Drugs, Smokes, Allergies, Last ate)				
b	Can relate relevant points from the patient examination (Airway assessment, respiration, CVS)				
c	Has checked the investigations (Hb, U+E; ECG+Cxray, S/B Dr?)				
2	**Check patient details**				
a	Ensure that this is the correct patient for the listed operation				Prompt if necessary: i) Who is present before you start?
b	Check that the surgeon is present before starting				
c	Check the operation site and that it is marked				
3	**Attend to the psychological considerations**				
a	Reassure the patient (introduction/ explanation)				
b	Attend to patient comfort/ modesty				
4	**Connect monitoring**				
a	Obtain pulse oximeter reading				
b	Take blood pressure reading				
5	**Establish an intravenous drip**				
a	Inform the patient what you are going to do (consent)				ii) N/A, if role play
b	Run through drip				
c	Insert IV cannula				

S.N.	Step/Task	P	M	G	Note
III	**Set up an IV infusion (SCORE OVERALL)**				
1					
a	Choose appropriate sized cannula				
b	Select the appropriate infusion fluid				
c	Hang infusion bottle/bag on drip stand				
d	Close the infusion controller near the fluid chamber				
e	Insert the giving set into the infusion bottle/ bag				
f	Half fill the fluid chamber (open the air inlet if needed)				
g	Lift the patient end of giving set level to the infusion bag/bottle and open the infusion controller				

h	When the fluid reaches the patient end, close the controller				
i	Check there are not large bubbles in the infusion set and then put it aside carefully				
2	**Cannulate the vein**				
a	Apply the tourniquet to the upper arm				
b	Choose vein for cannulation- ideally back of hand/forearm				
c	Clean over this area with alcohol swab				
d	Remove the cannula from packaging and place the plastic protector back into the packaging				
e	Stretch the skin over the vein and insert the cannula into the vein so that a flash back is seen				
f	Advance the cannula a further 2mm into the vein				
g	Holding the metal introducer, slide the outer plastic sheath into the vein for 1cm and then slide in the unit to its full extent				
h	Undo the tourniquet				
i	Fix the cannula wings securely with tape				
j	Occlude the end of the cannula with 2or 3 fingers				
k	Remove the metal introducer and insert into its' plastic protector, using one hand OR place into sharps container				
l	Connect the cannula and the infusion set together				
m	Open the infusion controller/ observe the drip running well				
3	**Post cannulation tasks**				
a	Set the drip rate as needed				
b	Take the packaging and contents (ideally in kidney dish) to the sharps container and dispose of metal introducer				
c	Remove gloves and dispose appropriately				

S.N.	Step/Task	P	M	G	Note
IV	**PERFORM BAG & MASK VENTILATION (SCORE OVERALL)**				Please fully demonstrate bag+mask ventilation. (i.e. full role play including commentary if not demonstrated on a patient). NB: Steps a and b should have been done under **I**. What would you need for a 4-year-old child? Small bag Small oral airway Small mask
1	**Getting ready**				
a	Collect the correct sized equipment (SIB, masks, airways)				
b	Ensure that oxygen and suction are available				
c	Treat patient kindly/provide emotional support as feasible				
d	Wear gloves				
2	**Open the airway**				
a	Ensure the patient is supine				
b	Place the head on a pillow				
c	Rotate the head into the sniffing position				
3	**Perform ventilation**				

a	Lift the jaw up -*don't simply rotate the head further -with fingers 3, 4 and 5				Show me what you would do if there is no ventilation (i.e. Jaw thrust and oral airway)
b	Fit the mask onto the face				
c	Hold the mask squarely in place with thumb and forefinger (1 and 2)				
d	Gently squeeze the bag -ventilating at 20 breaths per minute with a volume of 500 mls				
e	Watch the chest rise and fall with each ventilation				
f	Perform jaw thrust and insert airway if no ventilation				
g	If leaking around the mask -check mask is seated squarely				

S.N.	Step/Task	P	M	G	Note
V	**PERFORM LARYNGOSCOPY (SCORE OVERALL)**				If role-play – use intubation trainer with 'pillow' put to one side. Equipment should have been prepared under **I** including oxygen, suction i) What would you need for a 4 yr. old child? ▪ Wt. (age + 4) x 2 ▪ ETT size: Age/4 + 4 = 5 ▪ Small stylet At end: ii) What will you do with the equipment now? (Clean + dispose of gloves)
a	Ensure the patient is supine				
b	Place patient's head on a pillow				
c	Rotate the head into sniffing position				
d	Open the patients mouth, if required, with the right hand				
e	Take open laryngoscope in the left hand				
f	Pass laryngoscope into the mouth avoiding damage to the lips and teeth				
g	Pass the blade along the right side of the tongue				
h	Advance the laryngoscope down the pharynx, with the tongue on the left, slowly and carefully until the epiglottis is seen				
i	Advance the laryngoscope in front of the epiglottis as far as the vallecula				
j	Lift the laryngoscope upwards and forwards along the axis of the handle – do not rotate the laryngoscope				

S.N.	Step/Task	P	M	G	Note
VI	**PROVIDING SPINAL ANAESTHESIA**				Patient or use Volunteer initially and then Spinal trainer for the actual technique. Give full commentary if not a patient. Role play if with Volunteer
1	**Getting Ready**				
a	Ensure that "Patient Preparation" and "OT Preparation" are already performed. Resuscitation drugs and equipment are prepared.				
b	Prepare the necessary equipment for lumbar puncture and spinal anesthesia (lumbar puncture set, local anesthetic drugs(o.5% bupivicaine or5% lignocaine), emergency drugs, (Ephedrine, if not available Mephentamine Adrenaline) antiseptics with sterile swabs, adhesives and dressing).				
c	Treat the woman respectfully and with kindness and introduce yourself.				

d	Tell the woman (and her support person) what is going to be done, listen to her and respond attentively to her questions and concerns.				
e	Tell the woman that you will need her co-operation to complete the procedure successfully and with as little discomfort to her as possible.				
f	Provide continual emotional support and reassurance, as feasible.				
2	**Preparing the patient**				
a	Site an IV drip using 18 or 16-gauge cannula. Ensure that the drip can run rapidly.				
b	Pre-load the patient with at least 500 ml of crystalloid solution .				
c	Measure and record baseline pulse rate, blood pressure and SaO2.				
d	Place the patient in the lateral decubitus position lying on the edge of the bed and facing away from the operator. OR If patient is very obese, sit the patient with the back at the edge of the table , legs supported on a stool, arms encircling a pillow. Back should be straight and head flexed onto the chest.				
e	Find the posterior iliac crest and palpate the L4 spinous process, and mark the spot with appropriate skin marker, if necessary.				If no patient, change here to Spinal trainer
f	Clean the patient's back with the swabs and antiseptic solution , making sure that a sufficiently large area is cleaned. Allow the solution to dry on the skin.				
3	**Pre lumbar puncture tasks**				
a	Open set and open needles, syringes, as required.				
b	Wash hands thoroughly with soap and water and dry with sterile cloth or air dry.				
c	Put on sterile surgical gloves on both hands.				
d	Read the label on the anesthetic solution to be injected intrathecally, making sure that it is the desired drug within the expiry date.				
e	Draw the local anesthetic solution to be injected intrathecally into the syringe, from a single dose ampoule, opened by your assistant, taking care not to touch the outside of the ampoule.				
f	Place the syringe with the anesthetic safely on the lumbar puncture tray.				
g	Draw up the local anesthetic to be used for skin infiltration and place on the lumbar puncture tray.				

4	**Positioning and getting patient ready**				
a	With assistant re-position in the lateral decubitus (or sitting) position. Flexing the neck, back and hips. The head should rest on pillow.				
b	Drape the patient.				
c	Locate the previously marked lumbar puncture area, or if necessary, locate the L4 spinous process again.				
d	Identify the L3/4 and L4/5 inter-spaces and select the easiest.				
e	Inject a small volume of local anesthetic under the skin with a disposable 25- gauge needle at the proposed puncture site, to anesthetize the skin.				
5	**Performing the lumbar puncture**				
a	Recheck the IV drip to ensure that it is running.				
b	If using an introducer, insert it through the proposed puncture site. In the midline, orientate it slightly towards the head, at 90^{o} laterally. If the introducer needle is not being used then insert the spinal needle in the same orientation.				
c	Advance the introducer carefully.				
d	Insert the 25-gauge spinal needle through the introducer with the stylet in place. The spinal needle may be placed within the introducer needle, but not protruding from the end of it , prior to inserting the introducer needle				
e	Advance the spinal needle, ensuring that it stays in the midline and that the bevel is directed laterally, advancing the needle pointing slightly toward the head.				
f	Advance the needle until there is loss of resistance after piercing the ligamentum flavum and possibly, dura.				
g	Holding the needle steady in place , remove the stylet and cerebrospinal fluid (CSF) may flow from the needle.				
h	If no CSF appears after 5 seconds, replace the stylet and advance the needle further until another loss of resistance is felt as the needle pierces the dura.				
i	Holding the needle steady in place, remove the stylet and cerebrospinal fluid (CSF)should now flow from the needle.				
6	**Providing Spinal Anesthesia**				

a	Immobilize the spinal needle by resting the non-dominant hand firmly against the patient and by using the thumb and index finger to hold the hub of the needle.				
b	Take the syringe with the spinal anesthetic agent in the dominant hand and attach the syringe firmly to the hub of the needle. Take care not to move the position of the spinal needle.				
c	Aspirate gently to check that the needle tip is still intrathecal – CSF should flow freely to the syringe- then slowly inject the local anesthetic.				
d	When the injection is complete, withdraw the spinal needle, introducer and syringe as one. Place it within the spinal tray.				
e	Place the patient carefully into the supine position.				
f	Insert a wedge under the patient's right hip to tilt the uterus to the left. Alternatively, tilt the table 15^{o} to the left.				
7	**Care of the patient after spinal anesthesia**				
a	Give oxygen by facemask or intranasal catheter at the rate of 4 L/minute until after the delivery of the baby.				
b	Check pulse rate and blood pressure at least every 2 minutes.				
c	Assess the level of block.				
d	Ensure psychological support of patient; reassurance, comfort and dignity.				
8	**Post-lumbar puncture tasks**				
a	Before removing gloves dispose of waste materials in leak proof container or plastic bag.				What will you do with these things now that you have finished? (i.e. dispose of materials)
b	Place all instruments in 0.5% chlorine solution for 10 minutes for decontamination.				
9	**Post Operative Care**				
a	Monitor the patient (Oxygen, BP, Fluids)				
b	Give good post-operative instructions (oxygen, BP, fluid, analgesia)				What will you do post-op? (i.e. Monitor BP, fluids, analgesia, +/- oxygen)

S.N.	Step/Task	P	M	G	Note
VII	**RELAXANT GENERAL ANAESTHESIA (SCORE OVERALL)**				

	Full OT preparation and patient preparation should be done first.				If a Routine case, ask what would be done differently for an Emergency case.
1	**Induce general anesthesia**				
a	Estimate dose of drugs required				
b	Draw up necessary drugs				
c	Choose correctly sized equipment				
d	Pre-oxygenate patient				
e	Induce patient (Thio, Sux, Cricoid).				
f	Perform bag and mask ventilation				
2	**Perform intubation proficiently**				
a	Perform laryngoscopy				
b	Perform the intubation				
3	**Maintain general anesthesia**				
a	Position patient for surgery				
b	Perform general care of the patient (joints, eyes etc)				
c	Assess depth of anesthesia (BP, pulse, pupils)				
d	Assess degree of neuromuscular blockade				
e	Assess adequacy of ventilation (Listen airway/ Airway Pressure)				
g	Administer fluids as required (Regime)				
h	Administer anesthetic drugs as required (Top up dose)				
i	Monitor vital signs				
4	**Reversal of general anesthesia**				
a	Judge timings at the end of surgery (How)				
b	Reverse state of anesthesia				
c	Reverse of NM blockade (Doses)				
d	Perform extubation (Describe how, when, How to tell awake)				
5	**Post operative care (SCORE EACH)**				
a	Monitor the patient				
b	Give good post operative instructions (oral/ written) (Oxygen, fluids, BP, analgesia, monitoring)				

S.N.	Step/Task	P	M	G	Note
VIII	**INTRAVENOUS ANAESTHESIA**				This is a minor OT. Show me and tell me how you will proceed for IV anesthesia.
	Prepare: Bag + Mask ETT Emergency drugs Suction } 1 score				
	History and examination				

	IV Access				
1	**Induce the patient for IVA**				
a	Premedicate all the patients (atropine for children and diazepam for adults)				Question if role-play.
b	Using IV ketamine as sole induction agent (Dose)				
c	Using IM ketamine as sole induction agent (Dose)				
2	**Manage intra-operative care of the patient**				
a	Monitor the patient (including Airway, Respiration)				
b	Maintain the airway as required				
c	Extend the anesthesia as required with ketamine/gases				If role-pay, How?
3	**Perform postoperative care**				
a	Monitor the patient				
b	Give good postoperative instructions (oxygen monitoring, fluids, analgesia)				

IX. COMPLICATIONS:

You are conducting an LSCS under spinal anesthesia:

1. What will you do if the systolic blood pressure falls below 90 mmHg?
   - Speed up drips
   - Consider Vasopressors?
     - which
     - dose

You are starting an IV case:

2. You give your patient an IV drug and they develop circulatory collapse. What will you do?
   - Adrenaline – dose and route?
   - Fluids
   - Oxygen
   - Call for help

You attempt intubation twice but fail:

3. What will you do?
   - Call for help
   - Bag + Mask
   - Oxygen

Other:
Check if anesthetic chart present or not.

- Yes
- No

If yes, review and score chart.

- Good
- Moderate
- Poor

4. Checklist for equipment and drugs used for surgery

Score on the right side of each equipment as per the following:

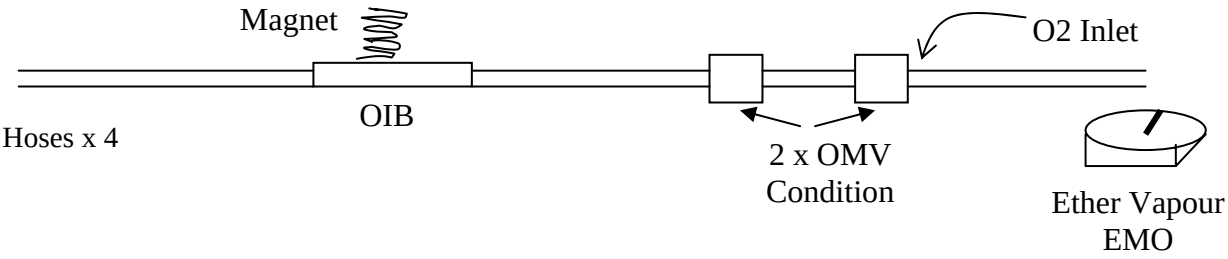
G = Good condition
M= Moderate condition
P = Poor condition
N = Not usable

Score cleanliness of the equipment on the right side of each equipment as per the following:

Clean = C
Unclean = U

Equipment:

1.	Oral airways	Sizes	1	2	3	Others?
2.	Masks	Sizes	1	2	3	Others?
3.	SIB					
4.	Patient Valve					
5.	Angle piece					
6.	Circuit:					



7.	Oxygen cylinder/Key								
8.	Humidifier								
9.	Flow meter								
10.	Oxygen pipe								
11.	Oxygen concentrator								
12.	Laryngoscope x 2								
13.	Child's blade								
14.	ETT & connectors	3.0	4,	5,	6,	7,	8,	9	Others?
15.	Introducer	Child			Adult				
16.	Bougie	Child			Adult				
17.	Magill's forceps	Child			Adult				
18.	Sucker Machine								
19.	Yankauer								
20.	Suction tubes								
21.	Suction catheters								
22.	Wedge								
23.	IV Giving sets								
24.	Venflom	18 G		16 G					
25.	Scissors								
26.	Tape for ETT								
27.	Adhesive Tape								
28.	Any other equipment?								
29.	Any spares?								

Drugs:

S.N.	Drug name	Observer's Remarks	Method of re-supply	Action during stock out
1.	Adrenaline			
2.	Atropine			
3.	Thiopentone			
4.	Ketamine – 50 mg/ml			
5.	Ketamine – other			
6.	Diazepam			
7.	Suxamethonium Chloride? In fridge?			
8.	Suxamethonium Bromide			
9.	Pethidine			
10.	Pentazocine			
11.	Morphine			
12.	Diclofenac			
13.	Ranitidine			
14.	Metoclopramide			
15.	Stemetil			
16.	Pancuronium? In fridge?			
17.	Neostigmine			
18.	Phenergan			
19.	Hydrocortisone			
20.	Ephedrine			
21.	Mephentamine			
22.	0.5% Heavy Bupivacaine			
23.	5% Heavy Lignocaine			
24.	2% Lignocaine with adrenaline			
25.	0.5% Bupivacaine Plain			
26.	Halothane			
27.	Trilene			
28.	Ether			
29.	Syntocinon? In fridge?			
30.	Ergometrine			
31.	Normal saline			
32.	Ringers Lactate			
33.	Haemaccel			
34.	Other IV fluid, state what			

Questions:

1.	Do you have adequate drugs and equipment to provide the required services safely? Yes No If no. How are you managing?
2.	Are there any problems with the anesthesia drugs? Yes No (Probe for supply and expiry of the drugs. Who sends them the drugs and what do they do if the drug expires?)
3.	Are there any problems with the anesthesia equipment? Yes No (Probe for quality of equipment.)
4.	Who manages the anesthetic equipment and drugs?