# NURSE ANAESTHESIA TRAINING IN BOTSWANA: HISTORY, TRENDS, OUTPUT AND CHALLENGES

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**Abstract**
Surgery is increasingly recognized as an effective means of treating a proportion of the global burden of disease. Violence, road crush accidents and obstetric emergencies have long ranked the leading causes of mortality and morbidity, and many deaths can be prevented through surgical intervention. Primary health care includes maternal and child health care, prevention of common diseases and appropriate treatment of common injuries and diseases including the provision of certain surgical procedures for which the administration of anaesthetics is essential. Achieving health for all requires special training to safely administer these anaesthetics and in many countries nurses as well as physicians receive this training. The need for trained anaesthesia providers is critical if surgery is to be a safe and cost effective public health intervention. In many countries including Botswana, anaesthesia is administered primarily by nurses; yet few, including many in nursing are aware of the major contribution to health that nurses functioning as anaesthetists make. Even some history books overlook nurses in anaesthesia. It is estimated that the nurse anaesthesia program in Botswana has trained 72 nurse anaesthetists in 41 years. There are no studies written about nurse anaesthesia training, practice and legal regulation in Botswana. The paper therefore, is a report that describes the history, trends of the nurse anaesthesia training program, output and challenges.

**Keywords**: anaesthesia, nurse anaesthesia, physician anaesthetist, surgery, anaesthesia training

## 1.0 Background

Hospitals throughout the world, and especially in developing countries such as Botswana, are overburdened with acute emergencies requiring anaesthesia and surgical interventions (Dubowitz & Evans, 2012; Notrica, Evans, Knowlton, & McQueen, 2011). Junior physician anaesthetists and nurse anaesthetists are often required to function as primary anaesthesia providers especially after hours and in peripheral hospitals (Park Ridge, 2007).The training of nurse anaesthetists is one approach to complement physician anaesthetists in Botswana. The delivery of anaesthesia care by none-physician anaesthetists is not unique to poor resource settings. It is reported that in the United States, certified registered nurse anaesthetists have performed nurse anaesthesia since 1800 (Rosseel, Trelles, Guilavogui, Ford, & Chu, 2010). At present Chief Registered Nurse anaesthetists (CRNA) administer anaesthesia for approximately two thirds of the 30 million surgical procedures in US, especially in rural hospitals (DeVasher, 2007); (Dulisse & Cromwell, 2010; Rosseel et al., 2010); (Nagelhout & Plaus, 2014). Similarly, in Botswana, which has a population of 2.3 million according to the 2011 Population and Housing Census, nurse anaesthetists provide anaesthesia services at referral, district and primary hospitals and are most likely the sole anaesthesia providers in primary hospitals(Statistics Botswana, 2011).

(McAuliffe & Henry, 1996) noted that nurse anaesthetists make significant contribution to healthcare worldwide. However, a little known fact is that, in many countries of the world, nearly all anaesthesia is provided by nurses. They further noted that in many countries including Botswana anaesthesia is administered primarily by nurses yet few, including many in nursing, are aware of the major contribution to health that nurses, functioning as anaesthetists make. Regulatory bodies (Ministry Of Health, 2017) recently started licensing post basic programs for practice including nurse anaesthesia. Nursing and Midwifery Council of Botswana (NMCB) is also in the process of developing nursing standards, including those of nurse anaesthetists, which is a good initiative (Ministry Of Health, 2017).

## 2.0 History of nurse anaesthesia training

The training of nurse anaesthetists in Botswana started in 1976 at Princess Marina Hospital (PMH). Two students were enrolled for a one-year program and awarded a certificate in Nurse Anaesthesia by the School of Nursing. The program was upgraded to a 15-months diploma in 1984, since it was difficult to cover all the basic topics of anaesthesia in one year. By then, the program had graduated only 16 nurse anaesthetists. There was no projected target number of nurse anaesthetists as there were no established curriculum and anaesthesia lecturers, hence no regular teaching (Institute of Health Sciences Gaborone, 2011).

In 1989, the training had to be suspended due to shortage of specialized human resource. However, the number of nurse anaesthetists produced was still far short of the national requirement. The Ministry of Health recognized the grave situation resulting from shortage of nurse anaesthetists; and the manpower division recommitted itself to restart the program at the National Health Institute, now Institute of Health Sciences (IHS).The program duration was 18 months followed by six months of internship. The graduates were awarded Advanced Diploma in nurse anaesthesia by the University of Botswana (Institute of Health Sciences Gaborone, 2011)

## 3.0 Training resources and enrolment

The Nurse Anaesthesia Program was initially offered at Princess Marina hospital (PMH) by the only physician anaesthetist in the country named Doctor Morris from England. As the country developed, it was now only offered at Institute of Health Sciences Gaborone out of the seven (7) health training institutions. The entry requirement was at first based on Basic Nursing Diploma and Midwifery Diploma. Unfortunately, not many nurses had midwifery as part of their qualifications by then. Hence all nurses with 2 years' work experience, biological sciences, and who had worked in ICU and Accident and emergency departments had added advantage. From 1993 to 2012, the average annual enrolment for the program was 6 students. There were 6 students for one lecturer. In 2003/2004, nurse anaesthetist lecturers were recruited to join the anaesthesiologist. Students were placed in different hospitals for practical experiences where they were regularly visited by their lecturers. The staff of Princess Mariana Hospital volunteered to provide them with mentorship and preceptor-ship. The last training of nurse anaesthetists was in the 2011-2012 program (Institute of Health Sciences Gaborone, 2011), after which the program was discontinued.

The reason for discontinuing the program is unknown. However, it is speculated that this was due to lack of qualified lecturers and anaesthesiologist to supervise the program. Similarly a study conducted by (DeVasher, 2007) reported that between 1980 and 2000, the nurse anaesthesia programs declined from 110 to 83, with 14 programs closing in 1985. The causes of these were controversial. The CRNA believed the causes included lack of administration and anaesthesiologists support and reduced program funding, which may be the case in Botswana.

**4.0 Program output**

The nurse anaesthesia program has 72 graduates and 6 of those have since retired from service. It is estimated that currently, graduates of the Institute of Health Sciences, Gaborone, provide anaesthesia services to about two third of the surgical procedures performed in Botswana. There are 5 nurse anaesthetists to 3 physician anaesthetists in PMH and 4 nurse anaesthetists to 3 physician anaesthetists in Nyangabgwe Referral Hospitals at the moment, just to show how invaluable the nurse anaesthetists' services are to Botswana (Institute of Health Sciences Gaborone, 2011)

The remaining 57 are deployed in district and peripheral hospitals where they provide anaesthesia services for emergency surgeries such as caesarean section. These nurse anaesthetists are all citizens of Botswana. Their input in saving mothers and children through anaesthesia services in district and peripheral hospitals cannot be overemphasized. This minimizes the number of unnecessary referrals which could jeopardize patients' lives especially the pregnant mothers in foetal distress and in need of urgent caesarean section to deliver the baby. Table 1 summarizes the trends and output of the nurse anaesthesia program between 1993 and 2012

**Table 1: Summary of trends and output of the nurse anaesthesia program between 1993 and 2012**

| Academic year | Number of students enrolled | Male | Female | Graduated |
|---|---|---|---|---|
| 1993 | 6 | 1 | 5 | 5 |
| 1995 | 6 | 1 | 5 | 6 |
| 1997 | 8 | 2 | 6 | 8 |
| 1999 | 8 | 1 | 7 | 8 |
| 2001 | 8 | 5 | 3 | 8 |
| 2003 | 6 | 3 | 3 | 6 |
| 2005 | 8 | 2 | 6 | 8 |
| 2007 | 8 | 4 | 4 | 8 |
| 2009 | 8 | 3 | 5 | 8 |
| 2011 | 7 | 5 | 2 | 7 |
| **Total** | **73** | **27** | **46** | **72** |

## 5.0 Challenges

(Van Houwe, 2007) reflected that the foundation of new schools to teach and train nurse anaesthetists is promising. However, this may not be applicable in Botswana as the program was discontinued in 2013.He further described problems in the overview of anaesthesia practice in Africa which included the deficiency of teaching and anaesthesia training. This is the case in Botswana. Between 1993 and 2003, the program had no teaching staff. Teaching was provided by anaesthesiologists from PMH until 2004 when two lecturers were recruited (Institute of Health Sciences Gaborone, 2011). Out of the 7 health training institutions, training was provided at the Gaborone Health Training Institution only, mainly due to lack of qualified training staff.

The suspension of the Nurse Anaesthesia Program will impact on the society due to the potential closure of operating rooms and reduced access to surgery. This is likely to be more pronounced in peripheral hospitals where nurse anaesthetists administer a significant percentage of anaesthesia services (DeVasher, 2007); (Dosch, Jarvis, & Schlosser, 2008). When a nurse anaesthetist goes on (sick) leave, and happens to be the only anaesthesia provider as is often the case in some of the district and peripheral hospitals, the society in that area is deprived of the anaesthesia services. This can lead to catastrophes such as maternal and foetal death in the case of pregnant mothers who need anaesthesia for caesarean section. Four nurse anaesthetists recently went abroad for greener pastures, 6 went into private practice in the country and the remaining 51 are deployed in the 2 referral, district and peripheral hospitals.

According to (Caruso, Chandra, & Kestler, 2011), Botswana has 4 doctors per 100, 000 population and over 90% of these are expatriates. Which means just a fraction of the 90% are physician anaesthetists, and this leaves the bulk of the work to anaesthetist nurses. However, the Faculty of Medicine at the University of Botswana initiated the training of physician anaesthetists by enrolling 6 medical doctors for Master of Medicine in anaesthesiology in 2011. They are due to complete their studies in 2017. This is a good initiative in strengthening anaesthesia services, especially that the anaesthesia residents are all citizens of Botswana.

## 6.0 Recommendations

Recommencement and re-scaling of the Nurse Anaesthesia Program is necessary to complement the few anaesthesiologists in the country. The profession must have accredited schools of anaesthesia in order to continue the Nurse Anaesthesia Program; schools of anaesthesia must have qualified faculty staff to meet accreditation standards. Anaesthesiologist should become more involved in the education and credentialing of nurse anaesthetists since they are the gate keepers to anaesthesia clinical practice. There is a school of nursing at the University of Botswana where nurse anaesthetists can be trained at Degree level to advance to Master’s Degree.

**Photo 1: The class of 2011-2012 nurse anaesthetists**

**Photo 2: Nurse anaesthetist at work**


## 7.0 Conclusion

The training of nurse anaesthetists in Botswana has been successful despite the challenges. The program showed commitment to producing competent graduates who administer anaesthesia competently and safely to save lives. The training of nurse anaesthetists in Botswana from 1993 to 2012 proved feasible as this led to tangible delivery of anaesthesia services throughout Botswana hospitals. The sustainability of this approach depends critically on recommencement of the nurse anaesthesia program.

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