



Impact of Collaborative Master Degree in Nurse Practitioner & Nurse Anesthesia Education Programs a Case of Eritrea

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Abstract

The School of Nursing (SoN) at Asmara College of Health Sciences (ACHS) suffered from a lack of qualified teaching faculty as well as teaching infrastructure both of which posed a major obstacle to producing competent graduates. To solve the problem, the ACHS sent BSc graduates to the United States and other countries to earn their Masters degrees; however, none of them came back to the country. Subsequently, with a view to reducing absconding, the ACHS resorted to creating partnerships with stronger universities and ran two in-country MSc programs.

Therefore the main Purpose of this study was to assess the impact of MSc nurse education programs through partnership with other universities in Eritrea. The ACHS conducted two in-country master's degree programs. The first one was accomplished through a partnership the ACHS Nurse Practitioner Program and Stony Brook University in New York (SUNY); the second one was carried out with the partnership of the ACHS Nurse Anesthesia program and Moy University. The Study design was descriptive utilizing both quantitative and qualitative approaches. All faculty members who graduated from the two programs at Asmara College of Health Sciences and BSc graduates from the Nurse Anesthesia program participated in the study.

The Results of the study reflect that both programs strengthened faculty capacity of the School of Nursing and Department of Anesthesia and helped in establishing sustainable undergraduate nursing education programs.

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Moreover, the anesthesia program improved the quality of anesthesia practice at the National Referral Teaching Hospitals.

Therefore, the Asmara College of Health Sciences has proved the effectiveness and benefits of running graduate education programs in partnership with stronger universities.

Practice Implication: Policy makers who are leading the national tertiary education institutions in Eritrea should strongly support the colleges and institutes to create partnerships to run graduate programs to strengthen faculty capacity and prevent brain drain in the country, which is the biggest national challenge.

Keywords: Collaboration; Education; Retention; faculty development.

1. Introduction

1.1 Country Back Ground

Eritrea is a country located in East Africa. It has a surface area of about 124,000 square kilometers with four distinct topographic regions: central highlands (2000 meters above sea level), western lowlands (1000 meters above sea level), eastern lowlands (500 meters above sea level) and coastal low lands (0-500 meters above sea level). Administratively the country is divided into six administrative zones. Estimated total population of Eritrea is 3.46 million composed of nine ethnic groups, 49.5% females, 50.5% males and a total of 28% adolescents [1, 2, 3,] with different health needs. The population of Eritrea belongs to the two religions “Islam and Christianity comprising 50% each practicing age-old traditions and beliefs that influences health behavior of the people. Eritrea got its independence in 1991 inheriting ruined social service infrastructures especially health service. The country was in acute shortage of qualified nurses, midwives and nurse anesthetists who are identified as back bone of primary health care delivery system globally [4].

1.2 Historical development of Nursing Education in Eritrea

Nurse practitioner and nursing anesthesia education have evolved in varying circumstances. The professional diploma nursing education program was founded in Asmara by a USAID-supported project in 1955. This program had a hospital-based curriculum, integrating general nursing and midwifery, and extended for duration of four years. In 1974 the midwifery aspect of the program was removed, shortening the period of nursing program to 2 1/2 years [5]. At this junction a separate midwifery school was opened and offered a one year post-basic diploma in midwifery until it was closed in 1996 [5]. At present the Nursing education program is cited at the Asmara College of Health Sciences under the National Commission for Higher Education Eritrea running degree and diploma education programs in nursing.

The nurse anesthesia (NA) program started officially in Eritrea in 1998 as a post-basic diploma program in the SoN in Asmara. The graduates from this program were dissatisfied because the NA diploma program was two and half years and had no vertical professional development. Thus all nurses refused to join the program. As a result the expanded National Health Service faced acute shortage of nurse anesthetists and nurse midwives [5].

1.3 Developments in nursing Education in Eritrea

Driven by the acute shortage of health care providers, the Ministry of Health Eritrea (MoHE) and The University of Asmara (UoA) in 1996 jointly conducted a national situational analysis on the need of mid-level health professionals who can address the primary healthcare needs of the population. A subsequent workshop that hosted national and international participants identified the need to establish three relevant programs, namely, a four year BSc. Public Health Nurse Practitioner (PHNP) program and two-year diploma programs in Laboratory and Pharmacy Technology. These programs were launched, with a mutual understanding of stakeholders, under the newly established Asmara College of Health Science in the University of Asmara. [6].

The PHNP program continued for three years until 1999, when the MoH recommended to change it to a Bachelor of Sciences in Nursing (BSN). Since its first intake of students in 2001, the BSN program has contributed competent professionals serving within the country's health care system at different levels. Moreover, since 2010, the SoN has started enrolling nurses with diploma from the clinical services for upgrading them to BSN with focus on areas of specialization (Midwifery, Anesthesia, Ophthalmic, Psychiatric and Pediatric nursing) [7].

However, since its inception, the SoN has continuously faced a shortage of staff that can produce the health professionals necessary to provide adequate health services and to help in the reduction of communicable and non-communicable disease burden in the country.

WHO reports and other studies have also found that, in many countries, the major obstacle to the achievement of MDGs (4-6) related to maternal and child health is the chronic shortage of qualified health workers mainly nurses and midwives [8, 9]. Indeed, it may be recalled that Eritrea has achieved MDGs 4,5 & 6. Yet, although the benchmarks of the MDG have been achieved, the fact remains that maternal mortality is still 486/100.000 live births that is not acceptable [2].

Experience of other developing countries, in collaborative programs between universities to build faculty capacity to improve their teaching capacities have been promising. [10]. Accordingly, in 1998, the University of Asmara and Stony Brook University began actively exploring grounds for collaboration in nursing education. This initiative was supported by USAID. Hence, in 2000, ten Eritrean nurses with baccalaureate degrees were sent to Stony Brook University for graduate education. While all students successfully graduated within four semesters, only one of them returned to Eritrea upon graduation. This strategy, therefore, failed to meet the intended goal of producing qualified academic faculty at ACHS [11].

To prevent absconding of students, the ACHS and SUNY adopted another strategy, which comprised of a distance education model for preparing Eritrean nursing faculty within the country. Thus, in the fall of 2004, ten BSc holding nurses who fulfilled the admission criteria were enrolled in four nurse practitioner MSc distance learning programs at SUNY [12]. All of these students who enrolled in the distance learning program graduated successfully and subsequently built the units of the SoN at ACHS. Each of the graduates taught a minimum of five years in the school and four of them are still teaching (2006-2015). This program attained the objective of

the collaborative ACHS and SUNY program and it was a good lesson for both universities.

Similarly, the shortage of faculty in the Department of Anesthesia in turn caused a serious shortage of anesthetists to the extent that some operating rooms were closed in 2007. Though the MoH recruited nurse anesthetists with diplomas from neighboring countries, the measure was insufficient. Hence, in 2008, the MoH, ACHS and the Department of Anesthesia at Moy University jointly developed MSc nurse anesthesia program that enrolled 8 students who successfully completed the program and served at ACHS as lectures and at MoH as nurse anesthetists and clinical preceptors of nurse anesthesia students.

Thus, the purpose of our study is to evaluate the impact of the joint SUNY-ACHS and MOY University-ACHS training programs in strengthening the SoN and its Department of Anesthesia and the delivery of anesthesia care in the national referral teaching hospitals.

2. Methodology

2.1 Study design

Cross-sectional descriptive study (Both quantitative and qualitative approaches)

2.2 Study site

ACHS School of Nursing, MoH/Health National Referral teaching Hospitals

2.3 Study population

Graduates from joint SUNY-ACHS and MOY university-ACHS training program, MoH managers and the BSc anesthesia graduates from the department of anesthesia. The target population composes the graduates from the joint MSc programs who are teaching at the SoN and the NA with BSc who graduated from the Department of Anesthesia who are working at the tertiary National Referral Teaching Hospitals.

2.4 Sampling

total coverage (all those who were available at the time of data collection)

2.5 Data collections tools and techniques

- Tool: data was collected using a questionnaire. The questionnaire covered the thematic areas of: the experience of students related to theoretical and clinical teaching of the program, changes observed as a result of the program,
- In addition to the quantitative questionnaire, a semi-structured qualitative questionnaire was also developed in order to elicit rich detailed information to complement the data collected through the quantitative questionnaire. It involved both Focus Group Discussions (FGDs) and in-depth interview with key informants (KII).

2.6 Data analysis

For qualitative data tables are utilized to explain the data collected, using frequency and percentages.

For Qualitative data is transcribed and themes derived from the descriptors.

2.7 Ethical consideration

- Permission was secured from the Asmara College of Health Sciences ethical committee, and the Ministry of Health Eritrea.
- The Study participants were asked for their written consent.
- Confidentiality was maintained throughout the research process.

2.8 Description of the Program

2.8.1 The partners

The ACHS conducted two joint MSc programs; first, the Nurse Practitioner program in 2004 in partnership with Stony Brook University (SUNY) and second the Nurse Anesthesia program in 2008 in partnership with Moy University.

At the start of first joint educational venture, the School of Nursing at ACHS was offering a diploma program and had just started a new BSc. Nursing Program (BSN). However, as mentioned above, the SoN was unable to offer a strong undergraduate program primarily because of a lack of qualified academic nursing faculty. For instance the BSN program initiated in 2001 relied on only three members of the nursing faculty who held a master's degrees in nursing.

Stony Brook University is one of the major university centers within the State University of New York educational system. The School of Nursing offers a Bachelor of Science degree in nursing as well as graduate degrees which prepare nurses for careers as midwives and nurse practitioners. Stony Brook was an early adopter of innovative distance learning methods assisted by computer technologies, and has been providing graduate nursing students with community-based access to all of its graduate nursing programs since 1995 [13].

The second educational joint venture was the MSc. Nurse Anesthesia program in 2008 that was conducted in collaboration with the Department of Anesthesia in Moy University, Kenya.

2.8.2 The Training Programs

2.8.2.1 The nurse practitioner (NP) program implemented in partnership with SUNY

The program of study offered to the Eritrean students was an adaptation of the graduate nursing program offered to students in the United States. Two Stony Brook faculty members traveled to Asmara in September of 2004 to conduct a pre-assessment of the university and clinical infrastructure, prepare for necessary

modifications, and fully orient students, faculty, administrators, and preceptors.

A learning lab was set up within the University of Asmara for the sole use of Stony Brook students. This lab, funded by a USAID grant and monitored closely by the Dean ACHS, contained a computer workstation for each student and ample space for student group work using textbooks and clinical models. Second, all textbooks, models, instructional equipment, and other learning resources required for the programs of study were shipped from Stony Brook to the University of Asmara (ACHS report).

The curriculum was nested within a learning management system with a computer database organizing all instructional materials. This database was developed by and was updated by faculty on a regular basis. Learning activities within the curriculum included lectures, graphics, readings, and worksheets. The faculty provided feedback and evaluation of the submitted work and returns it to the students for appropriate revision. This iterative communication process between faculty and students continues until the student has mastered the didactic competencies of the course.

For clinical attachment, preceptors were identified in collaboration with MoH, from the National Referral Hospitals. Each preceptor provided documentation of certification, licensure, and clinical and teaching competency. Before a clinical course, two faculty members from SUNY meet with preceptors and ensured that they were qualified and prepared to serve in this role.

Thus throughout the program (four semesters) students were attached and worked with preceptor and complete the clinical component of their program. Subsequent communication between faculty and preceptor then occurred regularly via telephone, e-mail. The ACHS took full responsibility of the administrative issues, regular clinical supervision and providing continuous feedback to SUNY.

The program was completed on the planned period of time and the 10 students graduated with great distinction having MSc degrees in NP.

Upon the completion of the program the nursing faculty members with MSc rose from three to thirteen with six areas of nursing specialty that made the school one of the strong schools in the University of Asmara.

2.8.2.2 The nurse anesthesia program implemented in partnership between ACHS and Moy University (MU)

The main objective of the program was to establish a strong department of anesthesia through the development of qualified local faculty members who can prepare nurse anesthetists and solve the extreme shortage of anesthetists in the country.

A two and half years MSc nurse anesthesia curriculum was designed by the ACHS curriculum committee, anesthesiologist professors from Moy University and with the input from Ms. Pamela Chambers and Mr. Terry English nurse anesthesia practitioners from the United States. The curriculum passed through approval processes at the ACHS and finally at the Board of Higher Education Eritrea. Simultaneously the nurse anesthesia BSc program was developed and approved passing through the same process. The one-off MSc nurse

anesthesia program recruited three anesthesiologists from Moy University (MU). To strengthen the clinical experience of students, three senior nurse anesthetists from the two Operating theaters at the Orrotta National Referral Hospital and Halibet Hospital were recruited as clinical preceptors after a thorough assessment of their credentials and clinical performance by the professors. Simultaneously the clinical sites were also assessed for their standards of practice.

The curriculum implementation was arranged in a way that will not disrupt the activities of the department of anesthesia at MU. Thus one of the professors was coming for one month and covers his course. He leaves students attached to the clinical practice and self study for one month and the second professor comes for one month and follows the same procedure. The exams of the students from the preceding professor were sent sealed to ACHS with the second professor and exams were conducted by the programming office. The exam papers were sent back sealed by the programming office for correction to the course instructor and results mailed back by DHL to Dean of the ACHS. Students were evaluated for both clinical and theory every three months.

The anesthesia program had great support from Ms Pamela chambers who sent anesthetic drugs, some equipments and CD Rom with anesthesia lectures. Terry English came and taught for a month. Mr Terry assessed the anesthesia clinical practice and gave his feed back to the ACHS and MoH. Moreover anesthesiologists from Germany came twice and taught regional anesthesia that enriched the competence of the students.

Upon completion of the program students had internal and external examinations and all passed. They also defended their dissertation paper as a partial fulfillment for their MSc. Degree in NA.

3. Results

The results reflect the data collected from the study population comprising graduates from joint SUNY-ACHS and MOY university-ACHS training program, as well as BSc anesthesia graduates from the Department of Nursing. Moreover the results are supplemented with qualitative data collected from MoH policy makers, Nursing and NA faculty and the BSc NA graduates working in hospitals.

3.1 Impact of the SUNY & ACHS collaborative nurse practitioner education program in strengthening the capacity of teaching faculty of SoN of ACHS

As described in section 2.8.1 above, the acute shortage of teaching faculty had been a stumbling block to the aspirations of producing competent nurses to serve in the health sector. The collaborative program pursued with SUNY followed two strategies. The first one saw 10 people going abroad to the US to get their postgraduate degrees. However, due to 100% absconding rate, the strategy did not work. On the other hand, the second strategy of offering a distance learning master's program proved to be effective. Indeed, all the ten nurse practitioners who graduated in 2006 from SUNY distance education program were recruited as lecturers in the SoN. The five graduates left the school after teaching a minimum of five years and the four are still teaching in the SoN for more than eight years. We can infer from this that a minimum five-year service to the SoN by the

graduates of the distance learning program has made an immense difference in capacity building, especially when compared to the period before 2006.

Individual interview with three faculty members who graduated from SUNY NP program:

Their views on the program during their training: they all appreciated the education package. The teaching and learning approach was empowering: “it was self directed; every student was connected to the course instructors, connected to the system, and had no communication barrier. The faculties at SUNY were very fast to answer any queries from students and solved encountering problems”. One said “SUNY taught me to be self-reliant and move on my own as an adult. It equipped me with the most up-to-date theoretical back ground of my specialty, unforgettable” . “Thanks to SUNY, it has boosted our teaching capacity and achieved its objectives in solving the chronic shortage of nursing faculty of the SoN”.

However they all expressed their concerns that they lacked the exposure to the well-established teaching and learning site.

3.2 Impact of the Moi University (MU) & ACHS collaborative MSc. nurse anesthesia (NA) education program in establishing a sustainable department of NA at SoN of ACHS

From the eight nurse anesthetists with MSc, the four best were recruited as faculty at department of anesthesia in ACHS and the four were assigned in the operating theaters of the three National Referral Teaching Hospitals (NRTH) by the Ministry of Health (MoH) and while working for the MoH they were also recruited as clinical preceptors for ACHS. Two from the clinical preceptors absconded after two years. One of the faculties from ACHS absconded after teaching for three years. The rest of them are still working. At present the four of the MSc. nurse anesthesia program graduates (NA) are teaching at the department of anesthesia. Despite the absconding of three MSc. nurse anesthesia graduates, the fact that four are still remaining and rendering their invaluable services at ACHS is very important, especially in light of the dreary situation that prevailed in hospitals before 2007, when operating rooms had to be closed due to a lack of anesthetists, as described in section 1.3.

The department of anesthesia at present is well staffed with standard teaching laboratories. It has graduated 58 NA with BSc.

Table 1 shows, response from 28 NA, four MSc holders faculty at ACHS taught by the anesthesiologists from Moi University and 24 BSc nurse anesthetists taught by these MSc prepared nurse anesthetist faculty at ACHS. All are from Tigrigna ethnic group and all belong to the Christian denomination.

All FGD and individual interview participants are selected because they know the health system very well before and after the anesthesia training program in the country.

Table 3 shows rating of both nurse anesthesia (MSc. and BSc.) training programs. The theoretical coverage and teaching capacity of teachers in both programs is rated very high. The clinical teaching is rated slightly lower

than the theoretical teaching. This was also reflected in their FGD discussions.

Table 1: Socio demographic characteristics of nurse anesthesia respondents 4 MSc & 24 BSc graduates

Age in years	Number	Percent
30-35	18	
36 – 40	8	
≥ 41	2	
Sex		
MSc in Nurse Anesthesia		
• Male	4	
• Female		
BSc in Nurse Anesthesia		
• Male	14	
• Female	10	

Table 2: Characteristic and number of qualitative data participants on NA program

Study participants	Size	Study method	Interview site
Human Resource development at the MoH	1	Individual interview	At work place
Clinical Services director at MoH head Quarter	1	Individual interview	At work place
Human Resource development MoH	1	Individual interview	At work place
BSc Prepared Nurse aesthesia (Clinical practice)	4	Two FGDs	At work place
MSc prepared nurse anaesthetists (faculty at ACHS)	4	Individual interview	At the university

Table 3: Rating of both theory and clinical aspects of teaching of the NA MSc and BSc training programs by the graduates from both programs

(1=poor, 2= fair, 3= good, 4= v.good, 5= excellent)

Item rated	1	2	3	4	5
Theoretical studies				13	15
Clinical experience during training				18	10
Instructor’s theoretical teaching capacity				9	19
Instructor’s clinical teaching capacity			6	12	10
Clinical teaching cites				7	21
Preceptor’s clinical teaching capacity			10	12	6
Your clinical performance at present					28

The MSc nurse anesthetist (current Faculty at ACHS) said “during our training as the clinical preceptors were

diploma prepared nurse anesthetist their theoretical back ground was poor and there was resistance for the introduction of new methods of practice which was gradually resolved”. The BSc NA graduates said “our teachers whom we know as MSc students are now the best NA practitioners in the country. Theoretically they are the best teachers”

Table 3: MSc and BSc graduates professional development after graduation

	Yes	No	Percent
Training gained after graduation			
• MSc.	4		100%
• BSc.		24	100%
Link with your training institution			
• MSc.	4		100%
• BSc		24	100%
Network among the graduates			
• MSc.	4		100%
• BSc		24	100%
Reading materials at the clinical site			
• MSc.	4		100%
• BSc	24		100%

Table 3 shows those BSc graduates in the clinical services have no access to any sort continuing education no connection with their university from which they graduated. On the other hand, the lecturers at the college have access to continuous exposure to latest methods of anesthesia practices because there are visiting professors from Germany. Moreover, the full time German professor who heads the department of NA program is engaged in continuously updating the MSc faculty’s academic capacity.

Over all comments given by al NA gradutes related to the training program and the clinical practice:

All said “the department of anesthesia at ACHS at present is the best. It contains well equipped training anesthesia labs and dedicated and competent faculty. The standard it has should be maintained, however students should have access to more recent books journals and internet service.”

Above all they said “there must be continuous in-service training for the nurse anesthetists in the clinical sites.

When the respondents were asked if the graduates from the nursing anesthesia program brought any change in the practice of anesthesia they said “it has solved the acute shortage of anesthesia service providers and improved the quality of anesthesia practice”.

Present status of the Department of Anesthesia

When the MSc. anesthesia training program was initiated the ACHS allocated a big classroom for anesthesia use only. This class was used as a classroom and laboratory for practice. It was equipped with four computers internet service and some anesthesia equipments that were borrowed from Halibet Hospital. Practical teaching almost depended on the operating theater of the two teaching Hospitals (Orotta and Halibet). The lecturers were all from Moy University and some volunteers who were occasionally coming from USA and Germany.

Now the Department of anesthesia which started from zero, is well staffed and equipped, department in the college

Table 4: Faculty Members at the department of anesthesia at ACHS at present

Faculty	Academic Rank
Professor Anaesthesiologist	1
Lecturers with MSc in Nurse anaesthesia	4
Clinical Preceptors with BSc in nurse anaesthesia	8

Table 5: Teaching infrastructure at the department of anesthesia at ACHS at present

Items	Quality
Two Anaesthesia Laboratories	Well equipped with standard Teaching modules and other items.
One big classroom	LCDs, video player
Three Faculty offices	Well equipped with computers, printers and copy machines

Changes introduced in the practice of anesthesia in the operating theaters of the teaching National referral hospitals

To make the clinical site a model teaching sites the MSc nurse anesthetists with their professors while they were students and after their graduation as faculty members assessed clinical practice gaps in the operating theaters of the three teaching hospitals namely Halibet, Orotta and Maternity referral hospitals. Based on the gaps identified they have introduced better practices and made improvements in the following areas.

- Improved quality of preoperative anesthetic care: Preoperative patient assessment and the administration of premedication drugs is now standardized that guarantee patient safety and better postoperative outcomes
- Intra-operative anesthetic management on patients undergoing surgery:
- General anesthesia: made basic change in the induction of anesthesia, pain management and type of

fluid administered

- Regional Anesthesia: The MSc prepared nurse anesthetist faculty is well equipped with the knowledge and skills of regional anesthesia. The regional anesthesia is incorporated in the BSc nurse anesthesia curriculum and the BSc graduates are equipped the necessary knowledge and skills. Now regional anesthesia is a common and safe practice in Obstetric operation which has reduced a lot of post operative complications.
- Post-operative care: Before the start of the anesthesia training program at the university no anesthetist followed their patients in the recovery room. Now postoperative patient follow up by the nurse anesthetists has become a routine practice.

Individual interview and Focus Group Discussion (FGD)

- Eight Individual interviews with the four anesthesia faculty and MoH officials the end product consumers of the program
- Three focus group discussions were conducted,
- the MSc NA lecturers at the department of anesthesia Asmara College of Health Sciences
- BSc Gradutes and students from NA program

The individual interview with the MoH reflected that the BSc NA graduates are very competent. The director of clinical services MoH head quarter expressed his appreciation “Oh wonderful the graduates are wonderful, very competent”, however he further said “the problem is how to retain them in the system. Even though the school is producing enough graduates we are still suffering from shortage of anesthetists”. The Administration and finance head MoH has similar views to that that of the director of clinical services.

The FGD: majority of the FGD participants are NA who have practiced anesthesia as diploma holders who are now upgraded and earned their BSc in NA from ACHS Dep. of NA. The participants discussed the anesthesia practice before and after the anesthesia training program. They said “at the start of the program while the MSc. Students were taking their training, there was a misunderstanding from those who were giving the service. It was due to lack of knowledge on the modern practice of anesthesia.

They said “now that we have gained the education we have identified the knowledge and practice gap we had”. Moreover they added “now since the establishment of department of anesthesia the quality of anesthesia practice in the national referral hospitals has improved. They introduced new techniques”. Our teachers they said “when they were doing their mater degree in anesthesia we didn’t realize that they will grow this much. Now both theoretically and in practice they are super teachers. We are lucky to be taught by them and they are ours. We hope we will work hard together to make more changes in the practice of anesthesia”.

4. Discussion

It is true that the SoN at ACHS suffered from shortage of qualified teaching staff. It tried to solve the problem by sending high caliber BSc holding nurses to the United States (US) and other countries and only one MSc.

graduate came back to the country. Moreover, due to the competitive international market for nurse educators and the low salary scale for expatriates in Eritrea, the college was not able to recruit expatriate nurse educators having graduate degree. Thus, with the expectation to improve the situation, the college looked for creating collaboration with universities who can offer distance education programs in the form of modules without disrupting their programs. This research assessed the impact of the MSc. education program in collaboration with SUNY and Moy University in ACHS and how much it has strengthened the faculty at SoN.

Overall, both programs worked well with remarkable impact. From the Joint SUNY-ACHS MSc. two years Nurse practitioner program all (ten of them) enrolled in the program graduated in four areas of nursing specialty in 2006. All were recruited as lecturers in the SoN that increased the number of nurse educators with MSc. from three to thirteen. The five of them left the SoN after teaching a minimum of five years while the rest of them are still teaching. Despite the attrition rate of 5/10 in the case of nurse practitioner graduates, it must be remembered that those who absconded served the ACHS for a minimum of five years before leaving.

From the joint Moy University-ACHS two and half years Nurse Anesthesia (NA) program eight graduated with MSc. in NA in 2010. The four best were recruited as lecturers in Dept. of Nurse Anesthesia SoN and the remaining four were assigned in the national teaching referral hospitals by the MoH and worked for ACHS as clinical preceptors. At present, the department of anesthesia is the strongest department at ACHS having four MSc NA lecturers and one anesthesiologist professor and two well equipped skills laboratories. Thus, collaboration strengthened faculty capacity and helped in establishing a sustainable undergraduate nursing and NA programs and improved the quality of NA practice at the National Teaching Referral Hospitals.

It is true that our globe is suffering from shortage of nursing and midwifery professionals. The scarcity of qualified health personnel, mainly retention of high quality nursing faculty is a critical concern in nursing education and biggest obstacles to achieving health system effectiveness (4-6) [9, 14, 15].

Reports from WHO 2008, WHO 2010, WHO 2011 and WHO 2012 also identified the critical obstacle for achieving SDG in developing countries is lack of trained human resource. Thus, all reports claimed that inter-country collaboration and interdisciplinary partnership for developing human resource is of paramount importance [16, 17, 18, 19].

Moreover Teshome identified, Higher education institutions in Africa suffer from lack of faculty, and debilitated institutional capacities of the higher education institutions. Therefore, Teshome affirmed, developing faculty, improving management and leadership, redeveloping curriculum, and enhancing physical facilities and infrastructure should be a priority for intervention. Finally, Teshome recommended development and strengthening of graduate (MSc and PhD) programs, and improving research and innovation capacities are also critical in institutions of higher education of Africa [20]. In addition, Hansen claimed, if universities in SSA countries are to contribute and improve health status of society, poverty reduction, achievement of the Millennium Development Goals, their research and teaching capacity should be strengthened. In this respect, universities in developing countries can benefit significantly from partnerships with research and higher education institutions from other countries [21]. The two collaborative programs at ACHS have proved the

efficacy of collaboration

The MSc graduates in NA not only strengthened the department of anesthesia, they have also improved the quality of anesthesia clinical practice in the national referral hospitals. Similar to this program, The government of Malawi established a linkage between the University of Edinburgh and, University of Malawi (UNIMA), the College of Medicine (COM) and Kamuzu College of Nursing (KCN), in Malawi to equip the health professionals who render maternal health with specialist education so as to reduce the high maternal mortality in the country. At present the Malawian universities are offering Masters Courses for doctors and nurses in maternal and child health specialties [22]. Similarly the John Hopkins Medicine (JHM) is playing a significant role in improving health of the population around the globe, through collaboration in medical education, nursing education service provision and research with Saudi Arabia, Qatar, Brazil, China, Colombia and others [23]. Moreover it is asserted that faculty capacity development in universities can also be achieved through interdisciplinary collaboration involving a variety of types of connections, such as working on a research or teaching project from a multidisciplinary perspective [24,25].

5. Conclusion

The experience of ACHS in implementing joint graduate education programs with SUNY and Moy University and study reports from around the world have proved the efficacy of collaborative programs among universities in strengthening teaching faculty and increasing staff retention. The collaborative distance learning programs in this study is a success because even if some of the graduates do eventually abscond, it is after rendering invaluable service for a few years to the college. These programs also helped in sustaining undergraduate educational programs at ACHS as well as producing competent health professionals to serve in the hospitals.

6. Recommendations

- The National Commission for Higher teaching institutions in Eritrea should work hard to assess possible linkages with other universities to establish graduate programs in all National Colleges.
- The National Commission for Higher teaching institutions in Eritrea should continuously assess the colleges and encourage them to build linkages to strengthen their teaching capacities
- Senior teaching faculty should have network and experience sharing exposures within and outside the country on how to run collaborative programs.
- The Colleges in Eritrea should work hard to create linkages to continuously upgrade their faculties at all levels

7. Study Limitations: few study participants.

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