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Sikkim Manipal University



SMU Medical Journal



ISSN : 2349 – 1604 (Volume – 3, No. 1, January 2016) Research article

Indexed in SIS (USA), ASI (Germany), I2OR & i-Scholar (India) and SJIF (Morocco)
databases

Impact Factor: 3.835 (SJIF)

Prospects of Simulation Use by Nurse Educators in the Training of Student Nurses in Fako Division, Cameroon

Mary, B. S. Atanga; Landis, C. Fongang; Roland, A. Acha; John, N. Palle
Department of Nursing/Midwifery, Faculty of Health Sciences, University of Bamenda, Africa

Corresponding author: Mary, B. S. Atanga
Phone: +237 677 23 97 37 Cell: +237 690 80 46 12

Manuscript received : 28.10.2015
Manuscript accepted: 27.11.2015

Abstract

Prospects of simulations among nurse educators depend on the knowledge, availability, affordability and applicability of the simulations in teaching nursing students. In terms of knowledge, the types of simulations, advantages, disadvantages and stage of use determine how well or how bad the applicability will be. Teaching and educating nursing students require the appropriate use of simulation, hence a good knowledge of the types of simulations, determinants of their use, importance of simulations and prospects with regards to background information are a vital pre-requisite. Experience has shown training and education of nurses and midwives in the

study area depends on theory and clinical practice but the use of simulation is too limited. Even when the simulations are available, the high quality simulations are lacking despite the fact that they are very necessary in the training and education programmes.

Based on this, the main objective of the study was to assess nurse educators' knowledge on the types, determinants, importance and prospects of simulations in the teaching of nursing and midwifery students. The results have demonstrated the use of low quality simulations in the study area though with high prospects for higher quality following software applications. It is therefore recommended that software medium and high quality simulations be made available by training institutions for consultation by staff and students.

Keywords: Simulations- types, determinants, importance, prospects in nursing/midwifery education

Introduction

Nursing education consists of the theoretical and practical training, provided to nurses with the purpose of adequately preparing them for duties in the future as nursing care professionals. This is normally done by professional nurses trained in the arts and science of teaching and other medical professionals who are qualified and experienced enough for the task [1, 2]. Current nursing education aims at developing a lifelong learner who can adapt effectively to changes in both the practice and theory of nursing. Nursing education is a profession which is vocationally oriented and requires the exercise of specialized services[1, 2]. For one to act professionally as a nurse, it will depend on his or her scientific knowledge, practical skills, professional judgment, attitude and value[2,3]. Nursing education is not only focused on teaching issues, what to teach and why but also how to teach[4]. It is also focused on teaching technical and non-technical skills, critical thinking and appropriate decision making skills[2] which promotes patient safety thus, vital in patient's care[5]. Hence, teaching methods which encourage continuous learning and efficiency in practice are now being incorporated in nursing education such as simulation, among others. This is done through the maximal use of well-equipped skill laboratories.

The training of nurses requires the use of tools such as video cameras, workshops / demonstration rooms, small group learning, simulators among others. The initiation of technology in health education such as simulation can help improve patient's safety with effective improvement of the affective, cognitive, psychomotor skills of student nurses[8].

Gomez and Gomez[7] refer to simulation as the “art and science of recreating a clinical setting in an artificial location”[7]. It serves as an adjunct to clinical environment as it gives room for conscious practice in an environment that is controlled. This control can be done either by an expert or a more experienced person. According to Frank *et al.*[6], with simulations, students are given the opportunity to first practice a particular procedure or exercise in an artificial environment on a simulator before they are exposed to live patients in a clinical setting[6]. Reeves[9] classified simulation based on the level of fidelity it offers. It ranges from low fidelity, moderate fidelity to high fidelity which is the most advanced form with a lot of computer related soft wares[9]. The integration of simulation in nursing education is expected to start in the classroom where the concepts and theories are introduced with the use of role modelling. After that, students are taken into a skill laboratory which is composed of mannequins and clinical equipment for them to learn practical skills and relate to practice in the real world[8]. According to Rodgers[10], simulation is a practitioner-based educational strategy in health care, it originates from the field of aviation [10]. Healthcare for about two decades has accepted and has been implementing the use of simulation techniques, this is because they have recognized the fact that medical error is not acceptable in their training or education[11,12]. Initially, simulation was done using animals as models and these dates back as far as 2000 years ago, then the use of mannequins later started in the 16th century[13]. Simulation especially high fidelity human simulation is now being used as a substitute or supplements to clinical exposure[6].

The use of simulation has been embraced in nursing education due to some overlapping factors such as: societal demand for safety and quality, ethical considerations, technological advancement, professional shortages, a changing landscape for the delivery of patient care among others[14]. Despite the aforementioned factors that have been identified to enhance the

use of simulation in nursing education, there are some other factors that have been found to impede its use in other parts of the world with Cameroon inclusive: knowledge in its use and cost of the simulators are identified to be relatively expensive[14].

Different approaches have been used in the definition of simulation by different authors but one thing that these definitions have in common is that simulation is all about an artificial environment.

Simulation refers to the development of an imitated clinical setting in an artificial location[7]. Others define simulation as a method that is used to improve skills by learning these skills on mannequins, models or visual realities, video cameras and getting immediate feedback from observers, participants or peer[14 - 16]. Gaba [17] also describes simulation as more of a ‘strategy’ than a ‘technology’ which permit interactions in learning through the use of tools that can mimic reality in a safe environment. Research carried out in the fields of nursing and medicine shows that there is an increase in the use of technology and simulation in these fields and this has been embraced in the effective acquisition of clinical knowledge and assessment of clinical skills[18].

The purpose of simulation according to Jeffries[19] and Morton[20] as published in an article presented by Mary Brinker titled “integrating simulation in a nursing course?”, is to imitate or create an artificial environment with rare and critical patient cases where novice nurses or student nurses can learn and practice skills safely without any fear of harm both to the patients and themselves. Also, so that students will subsequently, find it easy to intervene when it occurs in real life[19, 20].

Higher educational institutions as well as the medical field, healthcare facilities, have embraced the use of simulation in their training. The medical field has accepted and is using simulation in the training of practitioners to be able to rapidly intervene in emergency situations that can occur in the hospital setting. It also helps medical practitioners to be able to practice as

members of an inter-professional team within specific areas of specialization[21]. Nursing education is now fast adopting the use of simulation in their curriculum to serve as an adjunct or supplement to clinical practice and as an opportunity for student nurses to build their psychomotor skills[21]. There is an increase proficiency in health practitioners trained with the use of simulation than those who rely on clinical experience alone as can be seen in “resuscitation team trained with advanced life support on improving patients outcome following cardiac arrest”[22-30].

Problem Statement

Simulation is an innovation in the field of nursing education which is being used in most developed countries to supplement clinical teaching, and has been proven to be successful in boosting dexterity, patient safety, and self-efficacy of graduate nurses[6]. The training of nurses cannot be effective without clinical practice. Clinical training of nurses has been limited as a result of ethical concerns on the safety of patients, poor collaboration of patients and overcrowding at clinical sites due to hospital shortages[6, 7]. The use of simulation does not seem to be a norm here in the study area where demonstration rooms which do not reflect any degree of fidelity are still used for the teaching of practical skills alongside hospitals.

Furthermore, based on anecdotal reports and personal experiences during undergraduate studies, the first clinical training was on life patients. This posed a lot of risks to the patients, also, limited opportunities were granted to students in hospitals to meet their objectives due to ethical concerns. It is for these reasons that it was deemed necessary is paramount to determine the proportion of nurse educators who make use of alternative methods in teaching clinical skills such as simulation, factors influencing its use, constraints limiting its use and prospects in the use of simulation.

Research Questions

1. What types of simulations are available in Fako Division for training of nurses/midwives?

2. What determines the use of simulations among nurse educators in Fako Division?
3. What is the importance of simulations among nurse educators of Fako Division?
4. What are the prospects of simulations with regards to background information on their use in Fako Division?

Specific objectives

1. To identify the types of simulations available in Fako Division for the training of nurses.
2. To identify the determinants of the use of simulations amongst nurse educators in Fako Division.
3. To assess knowledge of the importance of simulations in nursing and midwifery education among nurse educators in Fako Division.
4. To identify prospects of simulation use following background information among nurse educators in Fako.

Materials and Methods

This study involved all nurse educators in public and accredited private nursing schools in Fako division. Non-consenting nurse educators were not part of the study as they were considered difficult to reach. Nurse educators who were absent and/or not reachable at the time of data collection were not also part of the study. The data collection instrument was a structured questionnaire made up of both open ended questions. This was developed to suit the research objectives. It was pretested (pilot study) and corrections made by rephrasing and deleting irrelevant questions before the actual phase of the data collection. The estimation of the sample size was based on estimating the proportion of nurse educators in Fako Division and taking a proportion that can be used to make generalizations. The minimum sample size needed for the calculation of the number of nurse educators in all the public and accredited private nursing schools in the Fako division was calculated using:

$$n_0 = z^2 pq / d^2$$

Where

n_0 = minimum sample size required for infinite population

p= pre-study estimate of the proportion of nurse educators who use simulations in Fako division and it has a value of 50% or 0.5 (and since there was no pre-studied estimate from previous studies, 50% or 0.5 was used)

$$q= 1-p$$

d= the degree of precision or the accuracy (=5% or 0.05)

z= standard normal variant at confidence level of 95% (normal value is 1.96)

Hence,

$$\begin{aligned} \text{Sample size } (n_o) &= (1.96)^2(0.5)(0.5)/(0.05)^2 \\ &= 0.9604/0.0025 \\ &= \mathbf{385 \text{ persons}} \end{aligned}$$

However, assuming the population of nurse educators, N is about 119.

Therefore the minimum sample size required for the finite population, n, was calculated as

$$\begin{aligned} n &= \frac{n_o}{1 + \frac{n_o}{N}} \\ n &= 385 / (1 + 385/119) \\ &= 385/4.23 \\ &= \mathbf{91 \text{ persons}} \end{aligned}$$

Thus the study targeted about 95 nurse educators.

The stratified sampling method was used to select nursing institutions and a purposive sampling method to select eligible nurse educators in these institutions. Stratified sampling method was suitable because nursing schools in Fako Division already exist in two strata, namely: Public and Private Institutions. Hence, an equal proportion of participants (80%) were collected from each of these strata in order to have representation of minority groups. A purposive sampling method enabled the recruitment of all nurse educators who met the inclusion criteria.

The study began after an ethical clearance was obtained from the Institutional Review Board of the Faculty of Health Sciences. This was done by applying for the clearance with an

attached copy of the research protocol and other necessary documents.

Administrative approval was then obtained from the heads of the different nursing institutions in Fako division. This was done by writing to the school administrations, explaining the purpose of the study, how it was going to be carried out with all necessary documents. The roles of the participants were clearly explained to them. Their benefit, risk associated with their participation and how these were going to be overcome were equally explained. An informed consent was sought before the filling of questionnaires. Participants received background information on the purpose of the research and how it was going to be done, and then they were allowed to decide whether or not to take part in the study. They were also made to understand that they were free to ask questions and were free to withdraw at any point in course of the study if they changed their minds without any explanation or punishment. Only those who proved full understanding of the purpose of the study were recruited. Those who met the inclusion criteria who were not available but could be reachable were also included in the study. Codes were used in place of participant's names and data collected were stored safely and analysed. Participants that took part in the study were nurse educators who met the inclusion criteria and were on duty at the time of data collection. Prior to the distribution of questionnaires to the participants, an approval was obtained from the administration of each institution. Repeated visits were made to each nursing institution to enable the principal investigator meet nurse educators. At each visit different nurse educators were used and requested not to tell any other nurse the type of questions they saw and responded. A brief explanation on the purpose of the study was made and clarifications done where needed. A signed consent form of those who were willing to participate was obtained after they had shown full understanding of the purpose of the study, before the questionnaire was given out to fill. Those who refused to participate were also verbally appreciated for their time and attention. Questionnaires were filled by participants under supervision by the principal investigator to ensure accuracy of data obtained from the participants. Each participant had a maximum of 30 minutes to provide answers to the questions on the questionnaire.

Results and discussion

The results have been presented using the specific objectives since they were in alignment with the research questions.

Distribution of respondents by qualification and type of institution

Table 1 below shows that out of the 89 participants, 69 were from private institutions, while 20 from public institutions. In private institutions, 3(4.3%) were PhD holders, while in the public institutions, 4(20.0%) were PhD holders; 22(31.9%) of participants were Master degree holders in private institutions while 6(30.0%) Masters holders participated in public institution; In private institutions, 40(58.0%) were holders of Bachelors degree while in public institution holders of Bachelors Degree had a frequency of 7(35.0%); finally, holders of State Diploma/HND had a frequency of 4(5.8%) in private institutions and 3(15.0%) in public institution. It was realized that majority of Nurse Educators in private institutions 40(58.0%) and public institution 7(35.0%) were Bachelors degree holders, while holders of PhD 3(4.3%) were the lowest in private institution and State diploma/HND holders 3(15.0%) were the lowest in public institution.

Most of the nurse educators 88 (98.9%) were aware of simulation except one 1(1.1%), probing into the types of simulation was to assess the Knowledge on simulation.

Distribution of Respondents by types of simulation known

As shown on figure 1 below, the most known type of simulation was low fidelity simulation 38(43%), followed by moderate fidelity simulation 17(19.0%), then high fidelity simulation 16(18.0%). A good number 18 (20%) of the nurse educators did not know any type of simulation

Something is known to determine whether or not one will use the identified thing. Based on this, the determinants of the use of simulations had the results below.

Table 1: Distribution of respondents by qualification and categories of institution

Qualification	Institutions				χ^2 - test	P- Value
	Private No(%)	(95% CI)	Public No(%)	(95% CI)		
Ph.D	3(4.3)	1.1- 11.4%	4(20.0)	6.7-41.55%	8.066^a	0.045
Masters Degree	22(31.9)	21.7- 3.5%	6(30.0)	13.1-52.3%		
Bachelors Degree	40(58.0)	46.1- 9.2%	7(35.0)	16.8-57.3%		
State Diploma/HND	4(5.8)	1.9- 13.4%	3(15.0)	3.9-35.6%		
Total	69(100)	95.8-00%	20(100)	86.1- 100%)		

Distribution of respondent by most preferred determinant of the use of simulation

As shown on figure 2 below, nurse educators believed that they will use simulation only if it is recommended in the school curriculum 45(50%) followed by personal choice 40 (45%). While some 3(4%) stated that simulation is not applicable in nursing education and few 1 (1%) preferred that simulation should be used only if it is the students’ choice.

Because of the minimal differences between personal choice and compulsory use of simulations as found on the above, it was very necessary for the importance of simulations to be assessed.

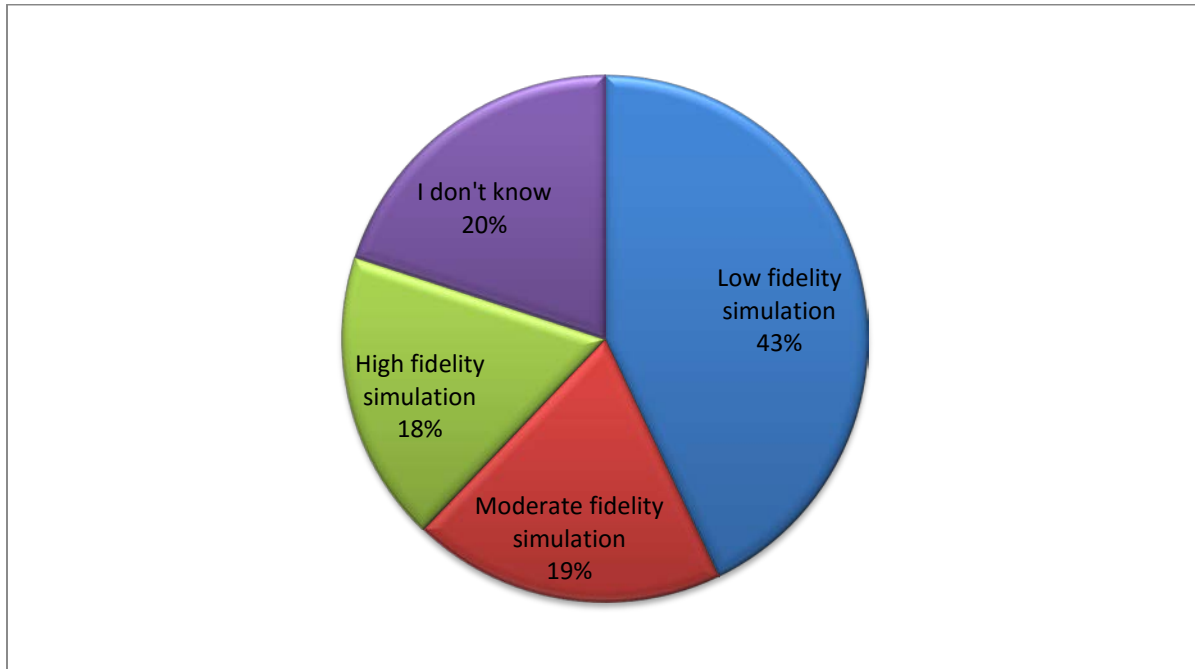


Figure 1: Distribution of respondents by types of simulation known

Distribution of respondents by perceived importance of simulation

Most Nurse educators 84 (94.4%) believed that the use of simulation in teaching is important in enhancing understanding by the students. While 5(5.6%) of nurse educators believed that the use of simulation had no effect on learning. With this, the majority were required to provided the most appropriate place for simulations to take place.

Distribution of respondents by place where they will prefer to use simulation

Nurse educators will prefer to use simulation in demonstration room 40 (59.7%) followed by classroom 27 (40.3%), while others will demonstrate only on real patients at the clinical facility. It was against this background that the participants were interrogated of sources of information on simulations and prospects of such simulations

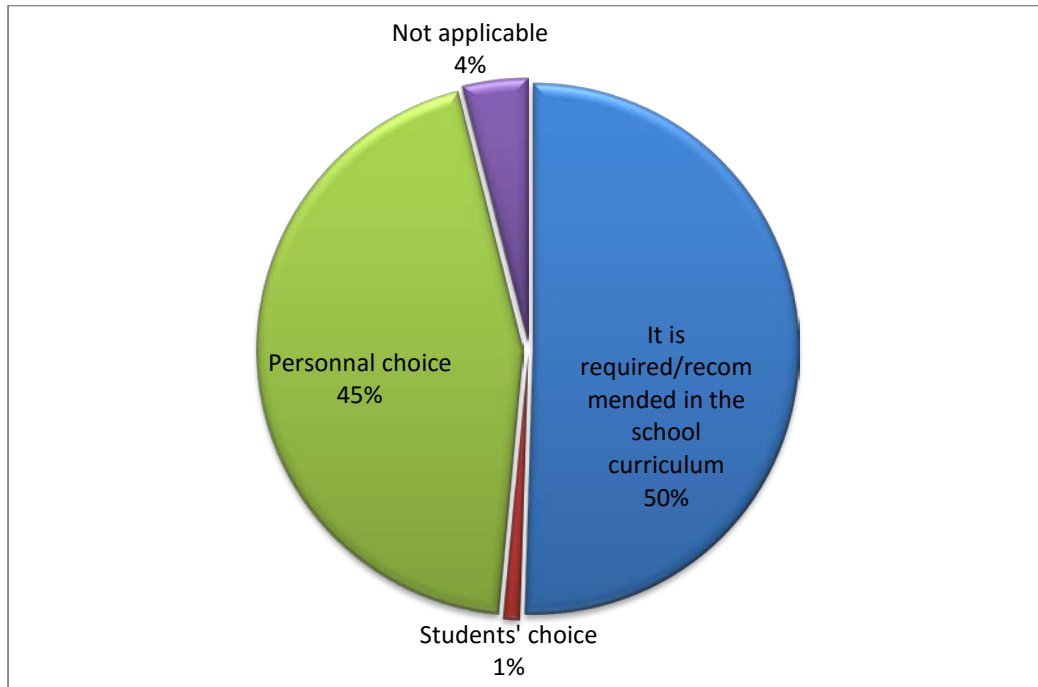


Figure 2: Distribution of respondents by most preferred determinant of the use of simulation

Distribution of respondents by prospects of simulation and background information

As shown in table 2 below, demonstration rooms were preferred more, for the use of simulation in both the private and public schools with values of 54(78.3%) and 13(65.0%) respectively. The more preferred area for use of simulation was equally dependent of age with demonstration rooms being chosen by all age groups as being the better location. Those within 24-35years of age had the highest frequency with a value of 29(76.3%). More males preferred using simulation in classrooms with a value of 12(52.2%) as compared to females 15(48.4%), on the other hand, more females 24(77.4%) preferred demonstration rooms more than males 16(69.6%). Holders of PhD and State Diploma/HND were the highest who preferred demonstration rooms with 3(100%) and the difference was statistically significant ($P<0.001$). For background information, majority of those teaching purely science subjects preferred demonstration rooms with a value of 2(100%) and the difference was statistically significant ($P<0.001$). Those with the least working experience (0-3) preferred demonstration rooms the

least 16(66.7%) but the difference was not statistically significant ($\chi^2=5.61$ P=0.061).

Table 2: Distribution of respondents by prospects of simulation and background information

Background information		Where simulation should preferably be used		Total No(%)	χ^2 -test	P-Value
		Classroom No(%)	Demonstration room. No(%)			
Institution	Private	15(21.7)	54(78.3)	69(100)	1.465 ^a	0.226
	Public	7(35.0)	13(65.0)	20(100)		
Age ranges	24-35	20(52.6)	29(76.3)	38(100)	0.15	0.926
	36-45	2(40.0)	3(60.0)	5(100)		
	46+	5(45.5)	8(72.7)	11(100)		
Courses taught by nurse educators	Purely science courses	0.0(0)	2(100)	2(100)	57.31	<0.001
	Non science/social science courses	4(57.1)	5(71.4)	7(100)		
	Nursing courses/other health related courses	24(50.0)	36(75.0)	48(100)		
Sex	Male	12(52.2)	16(69.6)	23(100)	0.46	0.499
	Female	15(48.4)	24(77.4)	31(100)		
Academic qualification	PhD	0(0.0)	3(100.0)	3(100)	64.42	<0.001
	Masters	12(54.5)	15(68.2)	22(100)		
	Bachelors	14(53.8)	19(73.1)	26(100)		
	State Diploma/HND	1(33.3)	3(100)	3(100)		
Work experience	0-3 years	14(58.3)	16(66.7)	24(100)	$\chi^2=5.61$	0.061
	4-7 years	8(40.0)	17(85.0)	20(100)		
	8+ years	5(50.0)	7(70.0)	10(100)		

The proportion of nurse educators who use simulation may be found to be good but the use of high fidelity simulations is very lacking. This is a pointer to the fact that real patients are often used in the study area to demonstrate to students. The questions to be asked here is whether it is ethical? The ethics of such depends on the nation, its policies and the said hospital and its

policies. Sometimes nurse educators may be dishonest when the clinical demonstrators are deceived into believing that the simulations on objects (low, medium and high quality) have been used earlier.

Using low and medium fidelity simulations as identified in the study area is common phenomenon of the developing world but it would have been better to acquire high fidelity models for simulations as they facilitate the learning process. The determinants of personal choice and imperatives of curriculum are not enough to push a nurse educator to use simulations in nursing education. Policy should be put in place with adequate follow up to ensure that simulations are performed. It would not be out of place to dismiss nurses educators who decide not to perform simulations. In the absence of simulation models, nurse educators should be the ones to resign from teaching until the models are available.

It is absurd to find out that nurses educators are aware of the importance of simulations but will still accept to teach without using them because they are not available or because they choose to use them or not, or worse still that the curriculum lays emphasis on the use of simulations but they are not used because of lack of knowledge. There will however be no prospects and therefore inadequate training and patients suffering from being used as demonstration objects.

Conclusions

It has often been said that train a nurse well so that he/she should in turn train well for continuity of adequate and patient wellbeing. The study has demonstrated a poor proportion of nurses educators that use simulations. High fidelity simulations are not used due to their unavailability on the one hand and laxity on the other hand on the part of school administrators. The determinants of use of simulations are personal choice and curriculum imperatives not minding the needs of learners (student nurses). Simulations are known to be important but using them does not match this importance. Lastly, the prospects of simulations may only be promising if something serious in terms of policy and follow up teaching are put in place.

Recommendations

1. The use of simulations should be imposed and made to compulsory in all training institutions for nurses, midwives and all health care personnel in the study area.
2. All forms of simulations should be acquired by all training institutions as nurses educators can also learn on the job when the models are available.
3. A policy on the use of simulations must be put in place and quality control of the type of simulations made always to ensure proper use of the different levels of simulations.
4. All nurse educators should be educated on the types of simulations and followup teaching with simulations made in order to ensure a future for nursing as competent graduates will be produced.

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Authors Column



Mary Bi Suh Atanga is an Associate Professor and Head of the department of Nursing and Health Promotion at the University, involved in teaching and conducting research in nursing, midwifery and community practice and wellbeing. She is also working as an independent consultant to health educational establishments in Cameroon and around Africa; and to some WHO activities mostly in Africa.

Mary Bi Suh Atanga is author of few books. She has published several research papers in international journals of repute. Presently her focus is on the place of the nurse-midwife in the Cameroonian Health Care Delivery System; violence against women; and workable and adaptable community intervention strategies.