

**DEVELOPING, IMPLEMENTING AND EVALUATING A MIDWIFERY SIMULATION PACKAGE ON  
POST-PARTUM HAEMORRHAGE FOR UNDERGRADUATE MIDWIFERY STUDENTS AT A  
UNIVERSITY IN KWAZULU-NATAL**

**Submitted to:**

**SCHOOL OF NURSING & PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCES  
UNIVERSITY OF KWAZULU-NATAL DURBAN  
SOUTH AFRICA**

**In:**

**Fulfilment of the Requirements for the  
Master of Nursing**

**BY**

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**2015**

## Declaration

I declare that this research entitled “Developing, implementing and evaluating a simulation learning package for undergraduate midwifery students at a university in KwaZulu-Natal, is my own work.

It is submitted in fulfilment of a Master’s Degree in Nursing by dissertation at the University of KwaZulu-Natal, South Africa. It has never been submitted for any other purpose.

All sources of information that have been utilised and quoted have been acknowledged with complete reference.

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December 22, 2015

## Abstract

Background: Training undergraduate midwifery students in the skills that are necessary to prevent, identify and manage post-partum haemorrhage, is essential.

Aim: The aim of this study was to develop, implement and evaluate a Simulation Learning Package on Post-partum Haemorrhage using High Fidelity Simulation.

Methods: A pragmatic approach using a mixed methodology was undertaken and experts in nursing /midwifery education and 4<sup>th</sup> year nursing students enrolled in an undergraduate baccalaureate programme participated. Data were analyzed using descriptive statistics and content analysis. The research was conducted in three phases. In phase 1, the simulation learning package was developed and evaluated by nursing experts. In Phase 2 the simulation learning package was implemented into a simulation scenario where 2 groups of students participated as role-players in the clinical skills laboratory. In Phase 3, the package was evaluated using a student satisfaction survey and focus group sessions.

Results of Phase 1: The findings revealed that most experts found the quality of the contents of the SLP to be suitable for undergraduate students in terms of the appropriateness of the contents, clarity of the learning objectives, currency of the information, relevance to the level of the student and the accuracy of the contents. The Simulation Learning Package was also found to be effective as it included a combination of active learning strategies, collaboration and diversity in learning and high expectations. The package was as easy to use as it was well presented and offered feedback opportunities.

Results of Phase 3: The majority of students found that using high fidelity simulation improves clinical skills, knowledge, critical thinking, self-confidence and learner satisfaction. Using high fidelity simulation also provides an in-depth learning experience and diverse learning styles to practice midwifery skills in a safe learning environment. Two focus group sessions were also conducted in the third phase of this study. The results of the focus group were condensed into 9 categories that revealed that using high fidelity simulation is an innovative teaching method; promotes teamwork; stimulates critical thinking skills; improves clinical competence; enhances learner satisfaction; identifies gaps; student empowerment; integrates psycho-social care; increases self-confidence.

Recommendations: Simulation learning complements clinical training and should be integrated into the undergraduate programme, annual simulation training sessions should be held staff members to sustain the implementation process . Sufficient time needs to be set aside in order to develop such learning packages.

Conclusion: High fidelity simulation within the undergraduate nursing curriculum can be very rewarding for both students and nurse educators and therefore should be prioritized as a 'need for change' to a simulation based module.

**KEYWORDS:** High fidelity simulators, simulation learning packages, post-partum haemorrhage, undergraduate nursing students.

## Acknowledgements

Firstly, all praises are due to Allah (SWT), the Almighty God for giving me the strength to complete this dissertation.

To my husband, Mr Azmuth Amod and our two daughters, Thabassum Bibi and Hawah Bibi, words cannot express how grateful I am for all of your love, support and patience throughout this research study.

A very huge 'THANK YOU' to Professor Petra Brysiewicz who guided, supported and encouraged me. God Bless you, Prof.

And last but not least, I thank all participants, facilitators, technicians, assistants and the editor for your contributions to making this dissertation fruitful.

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## Acronyms and Abbreviations

HFS- High Fidelity Simulation

HPS- Human Patient Simulators

WHO- World Health Organization

MDG- Millennium Development Goals

PPH- Post-Partum Haemorrhage

SLP- Simulation Learning Package

NESF- Nursing Education Simulation Framework

SCE- Simulated Clinical Experience

PBL- Problem-based Learning

RCOG- Royal College of Obstetrics and Gynaecology

## CHAPTER 1 -INTRODUCTION

### 1.1. Background to the Study

The need to critically examine different teaching and learning approaches within the context of nursing pedagogy is important due to the proliferation of technology, the digital revolution and the millennial generation, according to Parker and Myrick (2009). Simulation is defined by Jeffries (2005), as an active learning strategy that is learner-centred, with the educator acting as a facilitator of learning and the student demonstrating greater self-motivation and direction. Simulation has been used to augment learning in health care professions as it provides a safe, acceptable environment for practising skills (Bearnson and Wiker, 2005).

Low to medium fidelity simulators are currently used in the training of undergraduate midwifery students in basic clinical and emergency skills at the University of KwaZulu-Natal (UKZN). Since 2011, high fidelity Human Patient Simulators (HPS), which are computerised simulators, are available for the training of medical and nursing students at UKZN. These HPS represent the latest state-of-the-art simulation technology, and are used at different levels and in various disciplines. According to Wilford and Doyle (2006), realistic and interactive patient case scenarios are used to improve the skills, knowledge and critical thinking abilities of health care providers. The HPS are currently used in a variety of health care settings, some of which include the anaesthetic nurse programmes, staff development programmes and in medical and nursing schools and universities. An important issue in nursing education today involves the development of best practices in the use of the HPS, particularly as it involves the acquisition of new clinical skills for the novice practitioner (Bremner, Aduddell, Bennett & VanGeest, 2006). The use of simulation in teaching clinical skills has great benefits (Hyland & Hawkins, 2009). Bambini, Washburn and Perkins (2009) found that nursing students experienced a significant increase in self-efficacy, learned about the importance of communication, prioritised care and also gained confidence as a result of using simulation. Burns, O' Donnell and Artman (2010), in their study, identified that 82% of students showed a significant gain in knowledge, while all students showed a significant positive difference for multiple attitudinal items including critical thinking, overall nursing knowledge, confidence

and communication, whilst using a diversity of learning styles. A student satisfaction survey done by Lapkin, et al. (2010), concluded that simulation experience enhances the application of knowledge and skills, as well as improves clinical reasoning. It was also concluded in the same study that a need for more simulation experience exists, and that simulation should be used to complement clinical placement. According to Bray, et al. (2009), students can practice inter-professional collaboration and teamwork principles during the scenarios, which can improve patient care and safety. Birch, et al. (2007) in their study, showed that simulation based training can reduce errors and risks in obstetrics and at the same time, improve teamwork and communication skills.

According to Parker and Myrick (2009), the integration of complex simulation can be a powerful learning tool in articulating the sophisticated integration of knowledge, skills and attitudes. The use of high fidelity simulators within undergraduate nursing education programmes has occurred due to a number of factors, including growing concerns relating to patient safety, the making of mistakes and patient litigation (McCallum, 2007). Valadares and Magro (2014) state that the implementation of simulation allows students to practice and correct their mistakes in situations of clinical routine, without risk to patients and with minimal risk to themselves. Simulation allows for the improvement of the performance of the students, while reflecting on and learning from their failure, until they get it right. This is an unacceptable practice in a real situation and so simulation allows for students to practice, thus promoting high expectations of quality care among students, educators, patients and the community at large (McCallum, 2007).

Clinical teaching is aimed at producing a competent registered nurse capable of providing nursing care which is based on sound knowledge and practical skill (Mellish et al., 1998). Bremner et al. (2006) expanded further, explaining that HPS technology offers students the opportunity to experience pre-programmed rare events in a risk free environment. Students can observe different outcomes from specific actions chosen, which will not harm an actual patient. They will also be able to practice as a team and be involved in debriefing sessions

where they are able to reflect on their performance and identify gaps or errors in learning (Jeffries, 2007).

Obstetrics is a high risk unit where emergencies arise unexpectedly. It is therefore advantageous to train staff to manage these emergencies. Reynolds, Ayre De Campos and Lobo, (2011) found that health care professionals who had participated in a simulation based training course in obstetrical emergencies perceived a substantial improvement in their knowledge and skills when witnessing real life emergencies.

Maternal mortality is an indicator of reproductive health and socio-economic development in general. Udjo and Lalthapersadh-Pillay (2013) reported that the issue of maternal mortality has been thrust to the fore again by its inclusion in the Millennium Development Goals (MDGs) and has provided further impetus to studies on maternal mortality in recent years. The National Committee for the Confidential Enquiry into Maternal Deaths (2004), comments that changes in health legislation, health policy and in the delivery of health services in post-Apartheid South Africa have led to reforms in reproductive health. Despite these reforms, the high rate of maternal mortality is one of the country's major population concerns. According to Udjo and Lalthapersadh-Pillay (2013), the World Health Organization (WHO) defines a maternal death as the death of a pregnant woman within 42 days of termination of pregnancy, from any cause related to, or aggravated by the pregnancy or its management, irrespective of the duration of the pregnancy. It does not include death from accidental or incidental causes. The WHO's joint distribution of the causes of maternal deaths shows that 33.9 % of these deaths in Africa are due to obstetric haemorrhage (Khan, Wojdyla and Gulmezoglu, 2006).

The WHO (2015) reports a global decrease in maternal deaths of 44% between 1990 and 2015. Despite the decreasing levels of maternal mortality globally, and in Africa in general, it remains relatively unchanged in Southern African countries such as Botswana, Lesotho, Namibia, South Africa and Swaziland. Improvements in maternal and neonatal health are key components of the Millennium Development Goal 5 (MDG 5). Strategies to achieve these goals include ensuring that highly skilled staff members are in attendance in emergency obstetric care (Ameh et al., 2012). The Saving Mothers Report (2008-2010) identifies three preventable

maternal conditions that contribute to maternal deaths namely: non-pregnancy related infections, obstetric haemorrhage and hypertension in pregnancy.

Post-partum haemorrhage is the most common type of obstetric haemorrhage and accounts for 25% of maternal deaths worldwide. Post-partum haemorrhage (PPH) refers to an estimated per vaginal blood loss in excess of 500 ml following a vaginal birth, and a loss greater than 1000 mls during a caesarean section. The WHO (2012) defines major haemorrhage as an estimated blood loss of more than 2500 ml, or the transfusion of 5 or more units of blood or treatment of coagulopathy. PPH accounts for 10.6% of all direct maternal deaths in the United Kingdom and, according to the recent Saving Mothers report (2008-2010); it is the third most common cause of maternal mortality in South Africa. The enquiry concluded that a number of deaths were avoidable and highlighted that health care providers were doing too little, too late. Failure to assess the clinical picture, underestimating blood loss, delayed treatment, the lack of multidisciplinary team work and a failure to seek timely senior help are some of the issues that were highlighted. Maslovitz, Barkai and Lessing (2008) produced evidence that periodic practice at estimating blood loss led to improved clinical judgements, during a simulation scenario on PPH. In a randomised trial of simulation versus didactic teaching for obstetric emergencies, Daniels, et al. (2010) showed that simulation trained teams had superior performance scores when tested in a labour and delivery drill, and therefore concluded that simulation should be used to enhance obstetrical emergency training in resident education. In a systematic review by Merien, et al. (2010), it was identified that multi-disciplinary, simulation based, obstetric emergency training was potentially useful for reducing errors. Whilst Van Lonkhuijzen (2011) acknowledged the positive benefits of obstetric emergency training (some of which were simulation based), and the positive appraisal by candidates, that study concluded that an increased knowledge and skills improved performance.

The University of KwaZulu-Natal Undergraduate Baccalaureate programme is a four year programme which offers the midwifery module in the fourth year of training. This module consists of 15 weeks of basic midwifery theory and practical. The programme encourages the

use of problem-based learning and community based education to facilitate classroom teaching. According to Badeau (2010), problem scenarios are designed to challenge the learners to meet the curriculum objectives. When learners are presented with a clinical situation or issue, they engage in it as a group or team, thus promoting collaborative learning (Celia & Gordon, 2001).

The management of obstetric emergencies in the midwifery curriculum is currently taught using problem-based scenarios and therefore, introducing simulation training into the curriculum may enhance teaching and learning.

### 1.2. Problem Statement

There is a high percentage of litigation related to the clinical competence and negligence of nurses in the maternity departments in various levels of health care in South Africa. There is also a growing concern about the lack of clinical sites and opportunities for nursing students to gain clinical experience, which has meant that educators are looking to use simulation as an adjunct to the traditional clinical encounter, as a way that students can acquire nursing skills (Howard, et al., 2011). The use of simulation and High Fidelity Simulators (HFS) within the undergraduate nurse education programme is relatively new and has occurred due to a number of factors, including growing fears and concerns relating to patient safety, the making of mistakes and patient litigation (Nevin, Neill, Mulkerrins, 2014). Multiple learning objectives can be taught in a realistic clinical environment during simulation without harming patients or learners. Wilford and Doyle (2006) add that learners are able to reflect on their performances with a facilitator, thus improving their clinical competence and confidence before approaching patients.

Post-partum haemorrhage, which is an obstetric emergency, is a major contributor to the high mortality rates yet it remains an avoidable factor contributing to maternal deaths, according to the Saving Mothers report (2008-2010). Although much research has been conducted relating to simulation training in nursing, there is limited research available on developing, implementing and evaluating a simulation package for midwifery students using high fidelity



simulation training in South Africa. The purpose of this study is to develop, implement and evaluate a simulation learning package (SLP) on post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.

### 1.3. The Aim of the Study

This study aims to develop, implement and evaluate a simulation learning package on post-partum haemorrhage for undergraduate midwifery students.

### 1.4. The Research Objectives

The objectives of this research are:

1. To develop a simulation learning package on post-partum haemorrhage for undergraduate midwifery students;
2. To implement the simulation learning package for a group of midwifery students; and
3. To evaluate the simulation learning package on post-partum haemorrhage.

### 1.5. The Research Questions

1. What are the essential components that should be included in a simulation learning package on post-partum haemorrhage for undergraduate midwifery students?
2. What educational practices should be used in the simulation learning package on post-partum haemorrhage for undergraduate midwifery students?
3. What design characteristics should be included in the simulation learning package on post-partum haemorrhage for undergraduate midwifery students?
4. Will the undergraduate midwifery students be satisfied with the developed simulation learning package on post-partum haemorrhage?
5. Will the simulation learning package on post-partum haemorrhage stimulate critical thinking and self-confidence in undergraduate midwifery students?

### 1.6. The Significance of the Study

The importance of developing this simulation learning package (SLP) is to use innovative technology to simulate a real-life situation. This study may therefore contribute significantly to the following components of nursing:-

1. Nursing education: - By developing an innovative method of teaching the management of post-partum haemorrhage.
2. Midwifery Clinical Practice: - This is a safe way for students to practise a very important life threatening clinical skill with an 'almost real' patient. It also ensures that remedial work and feedback can be given throughout the intervention without harming the patient.
3. Nursing Research: - Limited research has been done using simulation in midwifery in South Africa. This study will thus contribute to this limited body of knowledge.

### 1.7. Operational Definitions

1.7.1. Simulation- refers to an act of imitating the behaviour of some situation or process for the purpose of study or student training. It is described as a near representation of an actual life event which may be presented by using computer software, role play and case studies that represent reality (Billings & Halstead, 2005). In this study, simulation will mean recreating an almost 'real life' emergency situation in the labour ward by making use of a high fidelity simulator.

1.7.2. High Fidelity Human Patient Simulator- is a computer- controlled mannequin that mimics interaction with students in a controlled simulated clinical setting. It is an "almost real" patient that responds to clinical interventions in a realistic way, according to Bearson and Wiker (2005: 421).

1.7.3. A simulation package- A package is a combination of items considered, offered or sold as a unit, as defined by The Free Dictionary (2014). In this study, a simulation package is a comprehensive learning package on post-partum haemorrhage which consists of learning objectives, pre-requisite knowledge, and preparation for and participation in a role-play on post-partum haemorrhage using high fidelity simulation.

1.7.4. Student- is a person\_who is enrolled to attend classes at a school, college, or university as defined by The Free Dictionary (2014). In this study, a student refers to a fourth year midwifery student registered in the undergraduate baccalaureate degree in nursing.

## CHAPTER 2 -LITERATURE REVIEW

### 2.1 Literature Search Strategy

The literature review section examines recent review studies, data and reports that act as the basis for the proposed study. Polit and Hunglar (1999) cite the purpose of a literature review as the exploration of studies that were previously conducted, so that the gaps can be identified, the relationship between dependables can be explored and the findings of what has been studied can be presented.

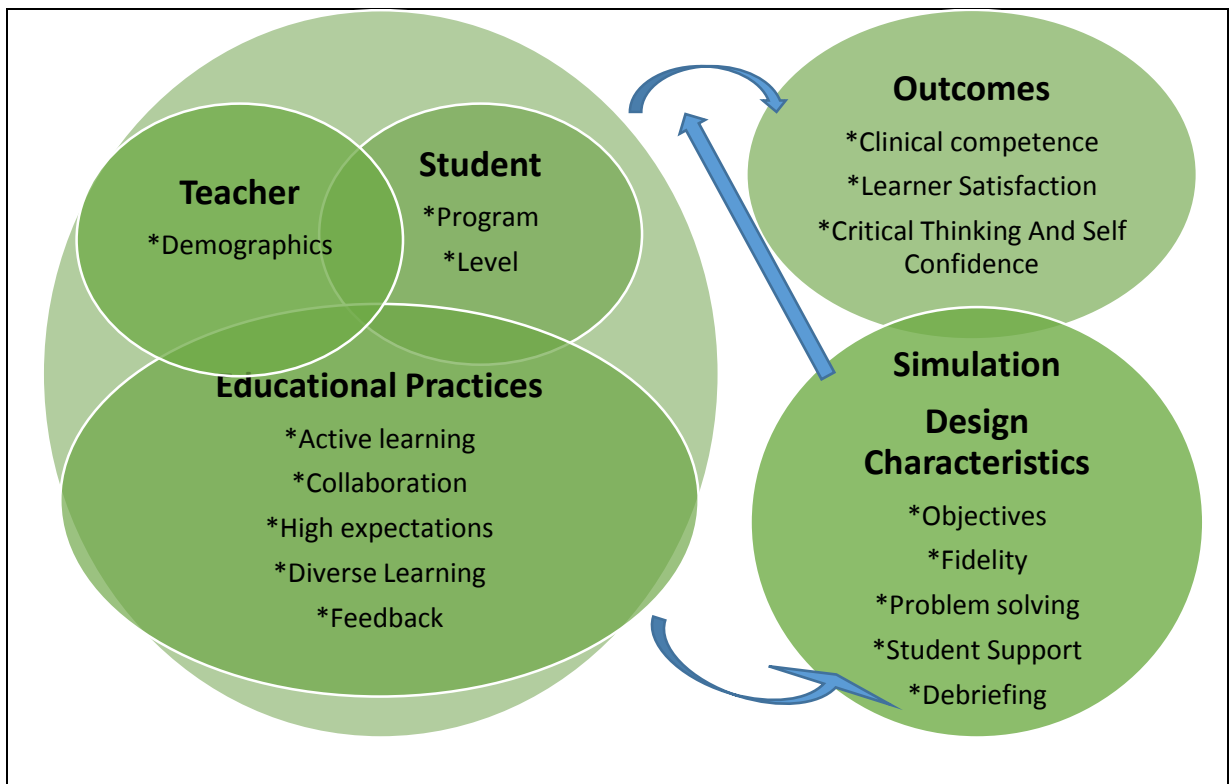
Literature was searched using the following databases: PUBMED, CINAHL, GOOGLE, GOOGLE SCHOLAR ADVANCE, SCIENCE DIRECT and EBSCO HOST. The search was undertaken using the key words: *simulation, simulation training, simulation manikins, simulation mannequins, simulation training in nursing education, simulation AND midwifery, maternal and child health, high fidelity simulation, SANC statistics on malpractice, and maternal death statistics.*

The following MeSH terms were used in PUBMED, SCIENCE DIRECT and EBSCO HOST:

*Simulation and nursing; High fidelity mannequins and simulation in South Africa; Simulation in nursing education; Simulation in midwifery education; Post-partum haemorrhage in South Africa; Maternal mortality and post-partum haemorrhage; South African Nursing Council Statistics and litigations; and Simulation in clinical learning.*

### 2.2. Theoretical Framework

The theoretical framework chosen to guide this study was The Nursing Education Simulation Framework (Jeffries, 2007). The researcher chose this framework because it is very comprehensive and encompasses all the components that are deemed necessary for a simulation education design. This framework has also been used in other research studies done in nursing education. Another framework considered was the CANMED framework, but upon investigation, it was determined as being inappropriate for use in this study as it concerned the roles of physicians and expert practitioners, rather than nurses. The Nursing Education Simulation Framework comprises of six components and these will be discussed below with the appropriate literature review. Refer to Figure 2.1.



**Figure 2.1. The Nursing Education Simulation Framework (Jeffries, 2007).**

## 2.3. The Framework Components

### 2.3.1. Teacher Factors

The teacher is essential to the success of any learning experience. Jeffries (2007) states that as a facilitator, the teacher provides support and encouragement to the learner throughout the simulation, asking questions, proposing “what if” situations, and guiding the debriefing at the conclusion of the experience. As an evaluator, the teacher typically serves strictly as the observer. As part of the simulation framework, selected demographics of the teacher such as the years of experience in midwifery education and clinical expertise in midwifery were associated with the teacher’s role, experience, comfort and overall use of simulations.

### 2.3.2. Student Factors

Students are expected to be responsible for their own learning and will, as a result, experience simulations differently. Jeffries (2007) alleges that they are more likely to fulfil their own

learning responsibilities if they know the ground rules for the activity. Such rules encourage and support learning, and the acknowledgement that mistakes are part of the process. Roles vary with the simulation but the most common roles are that of patients, nurses, family members, and other health care professionals. As with the teacher concept in the simulation model, the student concept also encompasses variables that may affect the students' simulation experience. In this study, the variables for midwifery students included the students' age, programme enrolled into and their level of education, (Jeffries, 2007). The participants of this study were midwifery students between 22- 35 years of age, enrolled in the baccalaureate of nursing programme.

#### 2.3.3. Educational Practices

The educational practices used to design this simulation framework included active learning, diverse learning styles, collaboration, and high expectations. These features were considered in order to improve student performance, critical thinking, self-confidence and learner satisfaction.

##### **2.3.3.1. Active Learning**

According to Jeffries (2007), Reilly and Oermann state that adult learners will lose interest in an educational experience without active involvement; this engagement in the learning process is critical when designing and using simulations. In nursing, simulation training began in the 1960's and has been advancing from low to medium to present day high fidelity levels. It was also used to evaluate the clinical competence of students enrolled in these nursing programmes. Active engagement can enhance students' critical thinking skills and provides the educator with an opportunity to assess the students' problem solving and decision making skills during the simulation experience, according to Billings and Halstead (2005). In this study, the researcher used the active engagement of midwifery students in the simulation scenario on post-partum haemorrhage. When engaging in active learning, students are expected to think about what they are doing, thus making the learning process meaningful (Bruce, Klopfer & Mellish, 2011).

The agreed simulation package related to the management of a patient with post-partum haemorrhage following a normal vaginal delivery. The ability to communicate the necessary information regarding the simulation session to students and the ease of use were considered when developing the package, as per the instructions by Jeffries (2007). The simulation scenario required students to care for a patient following a normal vaginal delivery and included details of specific health issues, including generic details that would usually be available when a patient is admitted to a labour ward. In addition, information about the various roles that they were expected to assume when caring for the patient with post-partum haemorrhage was available on action cards. This information was related to the lecture material received, which was in accordance with the midwifery module outcomes for the undergraduate programme.

#### **2.3.3.2. Collaboration**

Billings and Halstead, cited in Jeffries (2007), propose that the student-faculty relationship can influence the learning experience. These researchers add that the relationship should be collaborative and provide a suitable environment for the exchange of information. This will foster a climate of mutual respect in which the learner feels comfortable asking questions that will enhance learning. Constructive feedback provided by the faculty after the completion of the simulation is essential in fostering learning. The educator needs to obtain feedback from the learner about the simulation experience, in order to refine the experience. Feedback provides an opportunity to address concerns expressed by the learner and promotes an active learner involvement in the learning process. In this study, students were expected to work within an interdisciplinary team in order to manage a patient with post-partum haemorrhage.

#### **2.3.3.3. High Expectations**

Personal learning goals must be set by students, who should then seek advice from the faculty on how to achieve these set goals. Positive results are often achieved, when both the faculty and the students have high expectations of the simulation experience and the outcomes. Vandrey and Whitman (2001) found that nurses were able to expand their levels of

competency when practicing in a safe learning environment using simulation. In this study, students were briefed regarding their expectations in the role play. The level of expectation was increased by using a complex simulation scenario on post-partum haemorrhage, which is firstly an obstetric emergency and secondly, demanded collaborative learning. The outcomes of the scenario were dependent on the nursing interventions carried out by the students.

#### **2.3.3.4. Diverse Learning Styles**

Jeffries (2007) advises that teachers should understand that students come into a learning experience with a diversity of learning styles. This will help the teacher to optimise learning since students might be visual, auditory, tactile, or kinaesthetic learners. Therefore, educators need to incorporate activities into the simulation that will meet the needs of all learning styles.

This study introduces students to the theory underpinning the clinical assessment and management of a patient diagnosed with post-partum haemorrhage. Video materials demonstrating how to manage post-partum haemorrhage were viewed in a classroom setting, following a lecture on the topic. An introduction on how to use the Sim-Mom was conducted with the students in the clinical skills laboratory. It was essential for the students to familiarise themselves with, and to be prepared to work with the high fidelity equipment in a safe environment, in order to facilitate experiential learning.

#### **2.3.3.5. Feedback/ Evaluation**

A debriefing session was facilitated by the teacher, in order for the students to reflect on their learning and group process issues. Students were encouraged to discuss their experiences and ask questions relating to the scenario session. Feedback is an essential aspect of any simulation, and it is important to incorporate it after the simulation session, so that learners have the opportunity to perform and function in the professional role, make their own decisions and solve problems using their own learning experiences. Jeffries (2007) advises against providing feedback during the simulation, stating that the students may become dependent upon the instructor for the “next steps” or for prompts of what to do next.



#### 2.3.4. Simulation Design Characteristics

Design characteristics should incorporate five features: objectives, fidelity, problem solving, student support, and reflective thinking (debriefing), all of which must be addressed when developing a simulation. According to Jeffries (2007), the educator needs to define the features in relation to the simulation purpose, and determine the level of inclusion of each feature. The level of inclusion will depend on the intended outcomes of the simulation. In this study, all five design characteristics were incorporated to optimise the outcomes of the study and to identify how best simulation can be presented in nursing education.

##### **2.3.4.1. Objectives**

Objectives are the tools that guide learning, and are therefore essential when using simulations. The objectives of the simulation must reflect the intended outcomes of the experience and include sufficient details to allow the learner to participate in the simulation effectively. Wilford and Doyle (2006) used the Simulated Clinical Experience (SCE) as a tool that allows the lecturer/facilitator to teach multiple learning objectives using simulation. The tool provides a framework that allows the teacher to set up and run the simulator, provide learners with pre-simulation reading, offer teaching questions, suggest minimal behaviours and enhance the evidence based practises. According to Wilford and Doyle (2006), teaching using simulation needs to occur in a realistic environment, so that when the learners return to the workplace they can easily apply what is learned. Clinical learning is the most important part of learning in the nursing programme, because nursing as a career involves the implementation or application of acquired knowledge and skills to human beings. Errors can cost a patient his/her life, as well as lead to litigation, and simulation eliminates the risks inherent in practising health care skills on live patients (Bearnson & Wiker, 2005).

A Problem-based Learning (PBL) approach was used to meet the learning objectives of the midwifery module. It is widely accepted that learning and teaching in curricula for graduate entrants to nursing, and more specifically midwifery, needs to be both stimulating and challenging. The key learning objectives for this package will be in keeping with the set curriculum objectives, which are suitable for the level of students for whom it is intended. The

topic of post-partum haemorrhage is included in the curriculum, but not much emphasis is placed on the clinical aspects of managing the condition. The teaching methodology was changed in order to identify the effectiveness of the teaching, using high fidelity simulation. Experts in the field of nursing education and clinical practice were included in this study to evaluate the developed simulation learning package, to ensure that the contents included in the SLP were according to the university standards.

Feedback was obtained following the development of the simulation package; a component imperative to the success of this study. A two pronged approach was utilised to obtain the feedback:

- Firstly, lecturers and clinical facilitators were consulted to review a draft copy of the simulation package, thus ensuring the authenticity and relevance of the contents of the simulation package.
- Secondly, the reviewed draft simulation package was returned to the researcher, who updated the contents according to the feedback received from the selected experts before the implementation phase of this study.

The simulation learning package was then introduced to a group of students. Following the implementation, a debriefing session was conducted with the teacher validating the completion of the objectives, to discuss how the students met the objectives.

#### **2.3.4.2. Fidelity**

Wilford and Doyle (2006) define a simulator as any device or system that reproduces the conditions of a situation for the purposes of research or training. Simulation in nursing education exists on three levels of fidelity- low, medium and high fidelity levels respectively. Low fidelity simulations can be defined as simulations that are static and lack realism, such as a prosthetic arm used to demonstrate how to do a wound dressing. Burns, O' Donnell and Artman (2010). (2010) refer to this as a task trainer technology. Medium or moderate fidelity simulations increase the realism by using a prosthetic device or unit to mimic reality, such as

a lung and heart chest torso that has the capacity to produce both normal and abnormal heart and lung sounds upon auscultation with a special stethoscope (Bray et al., 2009). High fidelity simulation includes computerised mannequins that are operated by a technologist in another location, to produce audible sounds and to alter and manage physiological changes within the mannequins. These include the altering of the heart rate, respirations, chest sounds, and saturation of oxygen, (Bray et al., 2009).

In using a high fidelity simulation, the real-life situation must be replicated as closely as possible, suggest Medley and Horne (2005), when reporting on the NLN/Laerdal Simulation Study. This degree of replication was achieved by programming a patient simulator (Sim-Man) with selected verbal responses and by having the required supplies and materials available for caring for the “high risk patient”.

Hyland and Hawkins (2009) attest that there are great benefits relating to the use of simulation when teaching clinical skills. Bambini, Washburn and Perkins (2009) found that nursing students experienced a significant increase in self-efficacy, learned about the importance of communication, the importance of prioritising care and also gained confidence as a result of simulation training. Burns, O’ Donnell and Artman’s (2010), study identified that 82% of students showed a significant gain in knowledge, while all of the students showed a significant positive difference for multiple attitudinal items, including critical thinking, overall nursing knowledge, confidence and communication.

Despite these benefits, Hravnak et al. (2007) disagreed, arguing that simulation is not reality and that true patient interaction is limited. In a study done by Carolan–Olah, Kruger, Walter & Mazzarino (2014), midwifery students experienced a number of challenges associated with their pre-registration midwifery education, including difficulty understanding the relevance of some study units to midwifery practice, when using simulations. Burns, O’ Donnell and Artman (2010) also identified the significant financial and personal resources required for this type of training, meaning that this teaching method may not be suitable for all schools of nursing. In a literature review done by Ricketts (2011), it was discovered that while simulated learning in

a clinical skills laboratory was reported to increase student confidence and prepared students for real clinical settings, the acquisition of skills was often achieved at different rates by different students. It was also identified by Murray et al. (2008) that there is a lack of empirical evidence to show that the skills learned through simulations are transferred to the clinical setting.

The lack of clinical opportunities for student nurses to gain experience and integrate theory with practice is a growing concern for educators. Simulation is currently used in midwifery education, but this is limited due to the realism of the available models and equipment. There are also many aspects of midwifery practice that cannot be easily simulated, state McKenna, et al., (2011).

High fidelity patient simulators are available for use at the University of KwaZulu-Natal. However, their use within the undergraduate nursing programme is minimal. During this study high fidelity simulators were set up in the clinical skills laboratory (CSL), with the help of the laboratory assistants. The programming was done a month in advance, to ensure minimum errors and /or omissions during the implementation phase. Students were allowed a two week time period to practise their skills in the CSL.

In this study, high fidelity simulation was used to provide a 'life like' situation that allowed for patient - nurse communication. The exhibition of the appropriate signs and symptoms in the scenario allowed the students to engage with the HFS, in order to manage this scenario using critical thinking abilities just as they would do in a real life situation.

#### **2.3.4.3. Problem Solving**

Problem solving is related to the level of complexity of the simulation, which in turn needs to be based on the knowledge and skill level of the learners. The educator needs to reflect on the purpose of the experience and the learners' abilities when determining the level of complexity. A complex simulation should be at a level that is challenging to the learner, but attainable. The educator should provide the learner with an opportunity to prioritise nursing assessments,

provide care based on the assessments, and then be able to perform a self-evaluation (Jeffries, 2007).

In this study, a scenario on PPH was designed using problem-based learning methods. According to the Saving Mothers Report 2011-2013, PPH is a major contributor to maternal mortality in South Africa. The simulation scenario was designed urgent enough to have a potentially serious outcome if prompt and appropriate nursing diagnosis and intervention were not carried out timeously. The format for the simulation scenario was such that, instead of being heavily reliant on medical diagnostics, students could render the appropriate nursing interventions to decrease the magnitude of the problem and improve the quality of the patient's life.

#### **2.3.4.4. Student Support**

The support feature focuses on the assistance provided to the student. In creating the simulation, the facilitator needs to determine how and when to support and assist students. In this study, students were supported by the facilitator throughout the pre-simulation preparation. During the simulation session, students supported each other as they were expected to function as a team. To this end, peer support was encouraged by the absence of the facilitator from the scenario. A laboratory report and the presence of a birth companion were used as a cueing mechanism to guide students in providing holistic patient care.

#### **2.3.4.5. Reflective Thinking/ Debriefing**

Immediately following the simulation experience, students and faculty should engage in a debriefing session in which they examine what happened and what was learned. According to Jeffries (2007), this reflective thinking session provides learners with an opportunity to assess their actions, decisions, communications and their ability to deal with the unexpected in the simulation. Henneman and Cunningham (2007) agree with Jeffries, and that this session should occur immediately after the simulation is completed, so that the thoughts and feelings of the learner are not forgotten and do not get distorted over time.

In this study, the debriefing session was done immediately following the simulation experience. Students were encouraged to describe their experiences, both as role-players and as observers of the experience. The video recorded session was also played back in order to enhance reflective learning in nursing education.

#### 2.3.5. Outcomes

The last component of the simulation framework is the outcome. According to Kirkpatrick, DeWitt-Weaver and Yeagar (2005), evaluating outcomes is essential to determine what students have learned, and the overall effectiveness of the simulation experience. Learning outcomes, approaches and tools used to achieve the objectives need to be established and discussed prior to the simulation, (Kirkpatrick, DeWitt-Weaver & Yeagar). In this study, the following outcomes were evaluated:-

1. Clinical competence (learning and skills performance);
2. Critical thinking;
3. Learner satisfaction; and
4. Self-confidence

In the study conducted by Lapkin, et al. (2010), the results of a student satisfaction survey done revealed that the use of high fidelity simulation in nursing education increased clinical reasoning, improved the application of knowledge and skills and increased the value of the learning experience. There is a consensus that new models of education are required for student nurses to develop the knowledge, skills and abilities to be critical thinkers, independent decision makers, lifelong learners, effective team members and competent users of new information technologies (Drummond-Young and Mohide, 2001; Burns, O' Donnell and Artman (2010).

## 2.4. Conclusion

In this chapter, the literature search and the theoretical framework chosen to guide this study were discussed. The theoretical framework consisted of five components as they were inter-

related. Each component of the theoretical framework was further explored. Chapter 3 explains the research methodology of this study.

## CHAPTER 3- METHODOLOGY

### 3.1. Research Paradigm

The researcher chose a paradigm of Pragmatism. Pragmatist researchers, according to Creswell and Clark (2010), focus on the 'what' and 'how' of the research problem. Mertens (2009) relates that early pragmatists rejected the scientific notion that social inquiry was able to access the 'truth' about the real world solely by virtue of a single scientific method. While pragmatism is seen as the paradigm that provides the underlying philosophical framework for mixed-methods research, Mertens adds that some mixed-methods researchers align themselves philosophically with the transformative paradigm. The pragmatic paradigm places the research problem as central and applies all approaches to understanding the problem (Creswell & Clark, 2010). With the research question as central, data collection and analysis methods are chosen as those most likely to provide insights into the question with no philosophical loyalty to any alternative paradigm.

Although advocates of mixed-methods research have proposed pragmatism as a paradigm for social research, nearly all of that work has emphasised the practical rather than the philosophical aspects of pragmatism (David, 2014). According to Feilzer (2013), pragmatism as a research paradigm supports the use of a mix of different research methods as well as modes of analysis, while being guided primarily by the researcher's desire to produce socially useful knowledge. It will be argued that pragmatism can serve as a rationale for a formal research design, as well as a more grounded approach to research.

The theoretical framework chosen for this study, is a combination of demographic factors, educational practices and design characteristics that influence learning outcomes. This study moulds itself around a pragmatic ideology as it describes how the simulation learning package was developed, implemented and evaluated in three phases using a high fidelity human patient simulator in a post-partum haemorrhage scenario.



### 3.2. Research Design

Researchers typically use mixed-methods of research when they feel that the combination of the two methods provides greater insight and understanding into the research problem than either methodology on its own, or when it answers the research questions more completely (Creswell & Clark, 2010). According to Creswell, et al. (2011), when a researcher wants to develop a theory about a phenomenon, then a mixed methodology can be used to describe and then test it. The advantages of collecting both closed-ended quantitative data and open-ended qualitative data prove advantageous to best understand a research problem. Creswell, Klassen, Clark & Smith, (2011), states that a mixed method of research is more than simply collecting both quantitative and qualitative data. It indicates that all the data will be integrated, related or mixed at some stage of the research process. Mixed approaches can enhance a researcher's ability to answer complex questions in a manner which is efficient, internally valid, and generalizable, (Creswell, et al. 2011). In this study, the researcher chose a mixed methodology to verify the findings of the research.

### 3.3 Research Setting

The research setting was the University of KwaZulu-Natal, Howard Campus. The simulation learning package was developed for undergraduate midwifery students in the baccalaureate programme in nursing. The midwifery module is offered at level four of the programme. The module aims to produce students who are able to function with basic clinical competencies within maternal and neonatal nursing; enhancing their ability to evaluate and apply theoretical knowledge and contemporary evidence to their own clinical practice. The simulation scenario on post-partum haemorrhage took place at the CSL in the George Campbell Building. The area was prepared to appear as a labour ward, depicting a patient having post-partum haemorrhage following a normal vaginal delivery. All necessary equipment, supplies and human resources were available to conduct the session. The room preparation for the simulation setup was done a day earlier to minimise the preparation time during the allocated lecture period.

### 3.4. Phases of the Research Study

This study has three phases which are summarised in Table 3.1.

**Table 3.1. Phases of the Research Study**

Phase	Participants	Data Collection Process	Tools
<i>Phase 1:</i> Developing a simulation Package.	1. Experts. 2. Facilitators.	Literature review. Consultation with experts.	The Evaluation Checklist for Experts.
<i>Phase 2:</i> Implementation of the simulation package.	1. Students. 2. Facilitators.	A simulation scenario will then be carried out.	Video recorder.
<i>Phase 3:</i> Evaluation of the simulation package.	Students.	1. Questionnaire. 2. Focus group.	1. Student satisfaction Tool. 2. Audio tape

#### **3.4.1. Phase 1: Development of a Simulation Package**

##### **3.4.1.1. A Brief Description**

An extensive literature search was done, which included: a review of the Department of Health Clinical Guidelines for Obstetrics Care in South Africa (Department of Health, 2007); the Life-Saving Skills Manual: Essential Obstetrics Care (RCOG, 2006); as well as various other essential, relevant and appropriate research studies. The learning outcomes of post-partum haemorrhage, as per the module objectives, were considered when incorporating the guidelines for the development of the simulation learning package. The contents of the simulation learning package on post-partum haemorrhage included the following:

- *A simulation scenario on post- partum haemorrhage*
- *The pre-requisite knowledge for students*
- *The equipment and supplies needed*
- *The staff required and their roles in the simulation session*
- *The learning objectives/outcomes*
- *The simulation design process (including problem solving and reflective thinking)*
- *The debriefing session*

Once the simulation learning package was drafted, (refer to Annexure 10) it was printed, compiled and made ready for distribution to the identified experts for evaluation purposes. All experts were personally visited by the researcher at their institutions, and provided with an explanation of the purpose of the study. When experts showed a keen interest and were agreeable to participate in the study, a declaration of consent (refer to Annexure 5) and the draft SLP, together with an Evaluation Checklist for Experts (Annexure 6), were issued to the experts. The experts were given a period of approximately two weeks to review the package. Once reviewed, the expert contacted the researcher to collect the tools.

#### **3.4.1.2. Population, Sample and Sampling**

A purposive sampling method was used. A total of 16 experts were identified and consulted to participate in this study. This included four senior midwifery educators from the College of Nursing within the Ethekwini district, two midwifery senior lecturers from a University in the Western Cape, two experts who were nursing education lecturers from the University of KwaZulu-Natal, and the remaining two experts were obstetric lecturers from a Medical School. The inclusion criterion was a minimum of two years' experience in nursing education, midwifery or obstetrics education.

#### **3.4.1.3. Research Tools**

The Evaluation Checklist for Experts (refer to Annexure 6) was used to evaluate the simulation learning package on post-partum haemorrhage. This checklist was developed in 2007 by Professor Michael Scriven and permission was obtained from the author to use and adapt this tool, (refer to Annexure 13).

#### **3.4.1.4. Data Collection Process**

The Evaluation Checklist for Experts and the draft simulation package on post-partum haemorrhage were hand delivered by the researcher, and participants (experts) were given approximately two weeks to review the package. The package, together with the evaluation checklist was hand collected by the researcher, once the researcher received notification that they were ready for collection.

### **3.4.2. Phase 2: Implementation of the Simulation Package**

#### **3.4.2.1. A Brief Description**

The implementation phase commenced with a lecture which was conducted a month before the planned simulation session on post-partum haemorrhage. During this lecture time, the nature of the research was explained to the students, in order to establish their interest in participating. The students were informed about a prospective date, time and venue, and that the simulation session would be video-taped. A pre-scenario preparation list was provided to the students. Students were reassured that they were free to refuse participation and that refusal to participate would have no consequences for their learning. To ensure the authenticity of the experience and the environment, the students were requested to wear their full nurses' uniform when attending the simulation sessions in the CSL, which was prepared to imitate an actual set up of a labour ward/ delivery suite.

On the morning of the simulation scenario, the facilitator reminded the students of the process. Prior to entering the prepared simulation station, the students attended a briefing session where the researcher confirmed that the students were still consenting to participate in the study. The information sheets (refer to Annexure 1) and consent forms (refer to Annexure 2) were distributed to all participants, with the help of the research assistant. The simulation process was discussed and students were kindly requested to participate in the simulation session. Ground rules were established in the classroom and students were grouped into two groups of six students each. The first group to commence the simulation session was labelled as Group A, and the second group to participate named group B. Each group was given the opportunity to work as a team, using specific role expectations. This provided the students with the perspective to understand the learning outcomes and also made explicit the unique contributions and services provided by these nurses.

Both simulation scenarios were run by one technician and one facilitator who were requested to assist the researcher. Twelve (12) students (two groups of six students per session) participated in the simulation role-play on post-partum haemorrhage. When the groups commenced with their scenario, the remaining 37 students participated as observers to the

session. All the necessary equipment and supplies were available for use and the simulation sessions lasted approximately 10-15 minutes each. The researcher, together with the laboratory technician, operated and programmed the simulator. Following the simulation session, a debriefing session lasting approximately 30 minutes was held. The completion of a Student Satisfaction Survey (Annexure 7) concluded the implementation phase.

The following strategies for all four learning styles were incorporated into the simulation session:

- For visual learners, the room was set up to reflect a “real-life” setting of a labour/delivery room.
- The auditory learner was accommodated through interaction with the husband, whose role was played by a student.
- The tactile learning style was incorporated through the use of the SimMom, because the learner could auscultate lung and heart sounds, and obtain blood pressure, pulse and respiration readings.
- Finally, in the client’s room, there were dressing supplies, emergency equipment, and medications, which appealed to the kinaesthetic learners because they could actually handle equipment to implement nursing interventions.

#### **3.4.2.2. Population, Sample and Sampling**

The total study population (N=43) included all 4<sup>th</sup> year students registered for the module in 2015. No sampling was done.

#### **3.4.2.3. Data Collection Process**

The simulation scenario was video-recorded for the purpose of capturing all of the data that would assist in the debriefing session. Students were observed throughout the simulation scenario as the session was video-recorded.

### **3.4.3. Phase 3: Evaluation of the Simulation Scenario on Post-Partum Haemorrhage**

#### **3.4.3.1. A Brief Description**

Following the simulation scenario, the students were given the Student Satisfaction Survey (refer to Annexure 7) to complete. The questionnaire took approximately 10 minutes to complete. Two focus group sessions were conducted by the researcher and a research assistant. The first focus group session was conducted a week after the simulation session and included the students who had participated as role-players in the simulation session. A second focus group session was conducted two weeks later and included both role-players and observers of the scenario session on post-partum haemorrhage.

#### **3.4.3.2. Population, Sample and Sampling**

The total study population included all the 4<sup>th</sup> year students registered for the midwifery module in 2015, no sampling method was undertaken.

#### **3.4.3.3. Research Tools**

The Student Satisfaction Survey (Annexure 7) consisted of two sections. Section A related to the views of the simulation training, using a 5 point Likert Scale. The rating ranged from a scale of 1 to 5, where 5 represented 'strongly agree' and 1 represented 'strongly disagree'. Section B contained 2 open-ended questions which were added in by the researcher. This tool was developed by Nevin, Neill and Mulkerrins (2013). Permission to use the tool was obtained from the authors via e-mail.

Two focus group sessions (refer to Annexure 9) were also conducted to conclude the last phase of the study.

#### **3.4.3.4. Data Collection Process**

The student satisfaction survey was handed out to all participants, and collected immediately once completed by a facilitator (not the researcher). The students who participated in a focus group discussion were audibly recorded. The researcher led the focus group session, whilst a research assistant assisted with the writing up of additional notes. The purpose of the focus

group session was to establish the participants' overall experience in participating and/or observing the simulation session. The focus group sessions lasted approximately 30 minutes each.

### 3.5. Data Analysis

#### 3.5.1. Quantitative Aspects of the Study

The Evaluation Checklist for Experts and the Student Satisfaction Survey were analysed using descriptive statistics (SPSS Version 23.0). The open-ended questions on these tools were analysed using content analysis (Graneheim, and Lundman, 2004).

#### 3.5.2. Qualitative Aspects of the Study

All data analysed were divided into units of meaning, condensed, labelled and then coded into categories using content analysis, as per Graneheim and Lundman (2004).

### 3.6. Rigor

#### 3.6.1. Validity in Quantitative Research

The validity of an instrument is the determination of the extent to which the instrument actually reflects the abstract concepts being examined, assert Biddix, Ortlieb and Doepker (2009). The instruments used in this study were adapted for use according to the research objectives, research questions and theoretical framework. Therefore the instrument measured content and criterion-based validity.

Biddix, Ortlieb and Doepker define reliability as the accuracy and consistency of the information obtained in a study. In this study two quantitative tools were used. The Evaluation Checklist for Experts, (Annexure 6), which was used in Phase 1, to evaluate the quality of the developed simulation learning package. The checklist used in this study, was adapted to answer the research questions of this study. Permission to adapt the tool was granted from the author.

In Phase 3, The Student Satisfaction Survey, (Annexure 7), was used to evaluate the students' overall views of the simulation learning package. This instrument used in this study was used successfully in similar studies and was also adapted to suit this study. Permission to use and adapt the tool was granted from the author via email correspondence.

### **3.6.2. Validity in Qualitative Research**

Trustworthiness refers to the quality value of the final results and conclusions reached in a qualitative study, according to Lincoln and Guba (1985). The concepts of credibility, dependability and transferability have been used to describe various aspects of trustworthiness. In this study, the credibility was achieved by the prolonged relationship with the participants in the study. These students were fourth year students enrolled in the baccalaureate programme, who had been in contact with the researcher as their teacher and clinical facilitator previously. A trusting relationship therefore already existed between the participants and the researcher. These students were familiar with problem-based learning as part of the nursing curriculum.

The dependability of the study relied on the stability of the instruments used. A video recorder was used to capture the experiences of the participants during the actual simulation scenario. An audio recorder was used in the focus group sessions, where participants were encouraged to speak freely in order to express their views on the experience. The degree of transferability of the instrument, (The Student Satisfaction Survey), is highly recognised as this instrument was previously used successfully in a similar study by Nevin, Neill and Mulkerrins (2014), and can be developed and applied for future research studies. The researcher provided an in depth description to give the reader a sense of "being there", as well as attempting to demonstrate that the knowledge acquired may be relevant to a similar situation.

Confirmability was achieved when the data were analysed (with the guidance of the research supervisor who was experienced in qualitative research), by holding frequent debriefing sessions. This was to ensure that sufficient detail was provided, and to give the reader a



sense of the path taken by the researcher and how the interpretations of the results were derived.

### 3.7. Ethical Considerations

The following ethical considerations were applied in this study, guided by Emanuel, Wander, Killen and Grady (2004).

**Collaborative partnership**- Experts from various nursing educational institutions were invited to participate in the evaluation of the simulation package.

**Social value**- The beneficiaries of the study were the participants. The purpose of this study was to use innovative methods to teach midwifery students how to manage a patient with post-partum haemorrhage, so that when faced with a real life situation, they are able to provide best care practices.

**Scientific validity**- The scientific design in this study ensured that the participants had access to all their educational activities – even if they choose not to participate in the simulation scenario. The research study was feasible within the social, political, and cultural context. There was fair selection of the study population and all students were asked to participate in the study – no sampling was done. The study population was selected to ensure the scientific validity of the research. There were no risks to the participants.

**Informed consent**- The researcher obtained written consent in a culturally and linguistically appropriate format. The participants were informed of the freedom to refuse or withdraw from the study.

**Respect for participants**- Permission to conduct the research was obtained from all participants. An information letter and informed consent explaining the purpose and nature of the study was issued to each participant. The subjects were allowed to make an informed decision as to whether or not they wanted to participate in the study. Voluntary consent was obtained only when the subjects demonstrated a clear understanding of the information given to them. This ensured the Principle of Autonomy.

Participants were informed that they could withdraw from the study at any time. Furthermore, all participants were assured that no information given by them would be shared with another person without their authorisation. They did not receive any monetary benefits for completing the questionnaires. Permission to use the research instruments was requested from the authors. Permission was granted to use and adapt their tools to suit this study.

Permission to conduct this research was approved by the Registrar for Health Sciences and the UKZN Humanities and Social Sciences Research Ethics Committee. Protocol reference Number HSS/0320/015M on the 20 May 2015. (Refer to Annexure 8).

### **3.8. Data Management**

The analysed data has been saved on a computer protected by a password known only to the researcher. The data will be kept for a period of five years after completion of the study and then destroyed. All hardcopies will be kept for a period of one year and thereafter destroyed.

### **3.9 Time Frame**

<b>STEPS</b>	<b>DATES</b>
1. Ethical approval	May 2015
2. Permission from gatekeepers	May 2015
3. Development of a draft SLP package	May to August 2015
4. Draft SLP sent for expert review	August 2015
5. Revisions to the draft SLP	September 2015
6. Implementation of the SLP	October 2015
7. Data interpretation, analysis and management	September-November2015
8. Writing up of the findings/results	October - November 2015
9. Submission of the research project for examination	End November 2015

## CHAPTER 4: RESULTS AND DISCUSSION

This chapter presents the results and discussion of the analysed data in a systematic method, which is in accordance to the three phases of this study.

### 4.1. Phase 1: Development of the Simulation Learning Package on Post-Partum Haemorrhage for Undergraduate Midwifery Students

The simulation learning package on post-partum haemorrhage was developed using the processes outlined below.

#### 4.1.1. Literature Search

The literature was intensively searched to establish information on how to develop a simulation learning package, as well as the most up to date information regarding the management of post-partum haemorrhage. The following databases were searched namely: PUBMED; CINAHL; GOOGLE; GOOGLE SCHOLAR; SCIENCE DIRECT and EBSCO HOST. The search was carried out for English language literature, and literature published from 2008 to 2015 was accessed. From the literature searched, there appears to be a great deal of interest shown in post-partum haemorrhage and in high fidelity simulation over the last two decades. Only the most recent literature was retrieved and searched, however, to ensure that the information incorporated into this package was suitable for current clinical practices and for ensuring evidence based practice.

The following keywords were used in Google Scholar Advance, Ebscohost, Medline and CINAHL: *Simulation packages; Learning packages; Scenario development and Laerdal Simulators; Post-partum haemorrhage; and Post-partum haemorrhage educational packages.* The following MeSH terms were used in PUBMED and Science Direct: *Simulation and Training; Simulation and learning package; Simulation and Post-partum haemorrhage; Midwifery education and post-partum haemorrhage, Post-partum haemorrhage and simulation training.*

Literature was also searched using various health professional organisational guidelines, namely: the current WHO Policy Guidelines (WHO, 2012) and the South African National Department of Health Policy manuals (DOH, 2007). These included the Saving Mothers Report,

(DOH, 2013); an algorithm on postpartum haemorrhage, (WHO, 2009); the Life-Saving Skills Manual: Essential Obstetric Care, the ESMOE handbook by Van Den Broek, (2007); and the Guidelines for Maternity Care in South Africa (DOH, 2007).

#### 4.1.2. Compiling the Simulation Learning Package

The simulation learning package was developed using the Nursing Education Simulation Framework (NESF) by Jeffries (2007), as a guide. As part of the components of the theoretical framework used, the teacher's role and experience in the overall use of simulation was considered when developing the simulation learning package.

There were many similar studies which used high fidelity simulation in nursing. In a study done by Bambini, Washburn and Perkins (2009), findings revealed that nursing students experienced an increase in self-efficacy and confidence as a result of simulation as well as learned that communication and prioritizing of care are important aspects in simulation. Burns, O' Donnell and Artman (2010), in their study showed that 82% of students gained knowledge and all students showed positive differences for outcomes such as critical thinking, confidence and communication. These studies showed that there are many benefits associated with using high fidelity simulation and hence a growing interest to develop the full potential of high fidelity simulation in nursing exists.

In this learning package, the teacher's role was also that of the facilitator because of the complex nature of the designed simulation and because learning took place in a clinical skills laboratory and not in a class room setting. In this study, the teacher became the facilitator who provided support and stimulated the integration of knowledge and student interactions. The role of the facilitator was also to observe the student's involvement and learning progress.

This learning package was designed for 4<sup>th</sup> year midwifery students registered for the undergraduate nursing programme. These students were in the process of completing their nursing undergraduate degree and were soon to be placed in the community for a year where they would be expected to function as registered nurses.

The educational practices incorporated into the scenario role-play involved active learning, diverse learning styles, and collaboration with high expectations. These practices were considered when designing the scenario session, and were described in the theoretical framework of this study (Chapter 2). The researcher chose to retain these components as essentials in developing a scenario on post-partum haemorrhage in an attempt to produce a successful and competent health professional.

The design characteristics considered when developing this simulation learning package included the learning objectives for post-partum haemorrhage, as per the midwifery module outcomes; the use of high fidelity simulators (SimMom) in the undergraduate programme; the integration of problem solving skills in case scenarios; the promotion of student to student and facilitator to student support; and a debriefing/feedback session. The debriefing session concluded the simulation session, and reflected on the experiences of the role-players and the observers. The expected outcomes of the designed simulation learning package were to improve the clinical competence, learner satisfaction, critical thinking and self-confidence of the nursing students.

Current manuals and policies instituted by the World Health Organisation (WHO, 2009) and the National Department of Health for managing post-partum haemorrhage (DOH, 2007), were carefully interrogated, together with recent literature, for consensus regarding the best clinical practices. Various educational simulation tools were also searched to help direct the development of the simulation learning package. Guiding this package was the “California Toolkit to Transform Maternity Care,” (Gabel and Weeber, 2012). The drafting of the simulation learning package commenced in May 2015 and was developed over a period of 4 months. A draft copy of the simulation learning package on post-partum haemorrhage was then collated, aligned and sent for printing. A total of 16 hard copies were printed and compiled into a booklet format, ready for distribution to the experts for consultation.

#### 4.1.3. Development of the Evaluation Checklist for Experts

The Key Evaluation Checklist, (Scriven, 2011) has been successfully used in many research studies (Reed, 2010; Wilson, 2012; Nevin, Neill and & Mulkerrins, 2014) to guide evaluators in

planning, implementing and critically evaluating a report or an inquiry. Permission to use and adapt this tool was requested and obtained from the author via email (refer to Annexure 13). The checklist was adapted to guide experts in evaluating the simulation learning package. The checklist was then referred to as the Evaluation Checklist for Experts (refer to Annexure 6).

#### 4.1.4. The Reviewing of the Simulation Learning Package

A minimum of 16 educators were identified as experts, and were asked to evaluate the draft simulation learning package.

The following criteria were used to select the experts:

1. The expert was to be a qualified educator/lecturer who was employed either at a Nursing College or a University.
2. They were to be a specialist in the field of midwifery education, nursing education or obstetric care.
3. They had to have had a minimum of 2 years of teaching experience in their domain as a specialist.

A total of 16 experts were purposively identified. Letters to the experts (Annexure 4) were written and sent requesting them to evaluate the simulation learning package on post-partum haemorrhage. Ten of the 16 experts were agreeable to participate in the study. Each participant was issued with a declaration of consent form (Annexure 5) and a draft copy of the simulation learning package on post-partum haemorrhage. Consent forms, together with a simulation learning package were either hand delivered or posted to the participants. The completed consent forms were then collected and stored. All consent forms are kept in a safe place known only to the researcher.

Participants were allowed a two week time period to evaluate the simulation learning package. Correspondence was maintained through emails and telephonic enquiries. Appointments to collect documents were made and then collected as planned by the researcher.

#### 4.1.5. Evaluation Results by Experts

A total of 10 expert educators reviewed the simulation learning package on post-partum haemorrhage. Among the experts were 2 nursing campus principals, 2 Obstetric lecturers, 4

senior midwifery lecturers and 2 nursing education lecturers. The table below (Table 4.1) describes the demographic profile of the experts who reviewed the developed simulation package.

**Table 4.1: Demographic Profile and Comments of the Experts**

No.	Educational Qualification	Comments
1.	A lecturer with a Master's Degree	The package was excellent. There were no changes, however, feedback opportunity should be improved.
2.	A lecturer with a Master's Degree	The package was very good. Well Done. Just 1 addition- In Step 1 No.4, add in 'to stimulate and contract the uterus'.
3.	A senior lecturer with a PhD qualification	Simulation looks great, well done. Take cognisance of the Steps in Pathways- rather use critical omissions instead of 'any 6 of the above points'; also maybe use a different colour than amber that will be friendly to the eye.
4.	A senior lecturer with a PhD qualification	Relook at equipment and drugs- Add a 2 <sup>nd</sup> line IV fluid and standby bloods. Use ESMOE method - CAB then of Big 5, Forgotten 4 and Core. Relook at drugs used in sequence. Include a complete placenta somewhere. Facilitator should be able to respond to actions taken by students and adjust clinical signs and symptoms accordingly.
5.	A lecturer with a Master's Degree in Nursing	Rephrase "if student does not do..." Otherwise the package looks good and interesting. The information is found to be appropriate, enhances critical thinking and problem solving skills. Current and innovative strategies of teaching are used. The outcomes will produce an innovative learner who will respond to the needs of the community.
6.	A lecturer with a Master's Degree in Nursing	The package is very comprehensive and well written. However, a few questions. Is the package to be used as reinforcement, or as an assessment tool? Are there any other accompanying resources for this package or any other unit? What is the orientation to the use of the package for students?

No.	Educational Qualification	Comments
7.	A lecturer with a Master's Degree	Include a 2 <sup>nd</sup> IV line as BP is low 90/50. Allocate a point for release after 'Rub up fundus' and reassess the state of the uterus. Role of the Husband- what learning outcome will he accomplish. Look at the processing of skills in the assessment e.g. rubbing up fundus and releasing. Also recommend the use of action cards.
8.	A senior lecturer with a PhD qualification	The simulation package is good and will definitely be useful in the evaluation of student competencies. Further, the usability can be improved by reducing the content and making it more visual.
9.	A senior lecturer with a Master's Degree	An excellent learning package, relevant and appropriate for empowering midwives.
10.	A senior lecturer with a Master's Degree in Nursing	Excellent, the method is good for both the learner and the facilitator. The programme is well organised, specific and time-saving. The model mimics the actual patient. The learning objectives are clear. The procedure is specifically outlined. The model on the outcomes of the proposed scenario is appropriate, simple and clear.

#### 4.1.6. Results of Phase 1 as per the Evaluation Checklist for Experts

The expert participants were asked to complete an Evaluation Checklist regarding the content of the simulation learning package. The tool contains three sub-components namely, the quality of the contents, the effectiveness of the tool and the ease of use. The results are reflected in Table 4.2.

**Table 4.2: Expert's Responses to the Evaluation Checklist**

Quality of the Content	Poor(n)	Fair (n)	Good (n)	Excellent (n)
	1	2	3	4
Is the content of the simulation package appropriate?	0	0	4	6



Are the learning objectives clear?	0	0	3	7
Is the content current?	0	1	1	8
Is the content relevant to the level of the student?	0	0	1	9
Is the content accurate?	0	2	0	8
<b>Effectiveness of the Simulation Learning Package</b>				
Does the simulation package include active learning practices?	0	0	3	7
Does the simulation package allow for collaboration with peers and the facilitator?	0	0	4	6
Does the simulation package use innovative/ diverse learning styles?	0	0	3	7
Do the objectives reflect high expectations of the learner?	0	0	4	6
<b>Ease of Use</b>				
Does the simulation package present information in an appealing way?	0	1	3	6
Does the simulation package allow for feedback opportunities?	0	1	2	7

#### **4.1.6.1. Quality of the Contents**

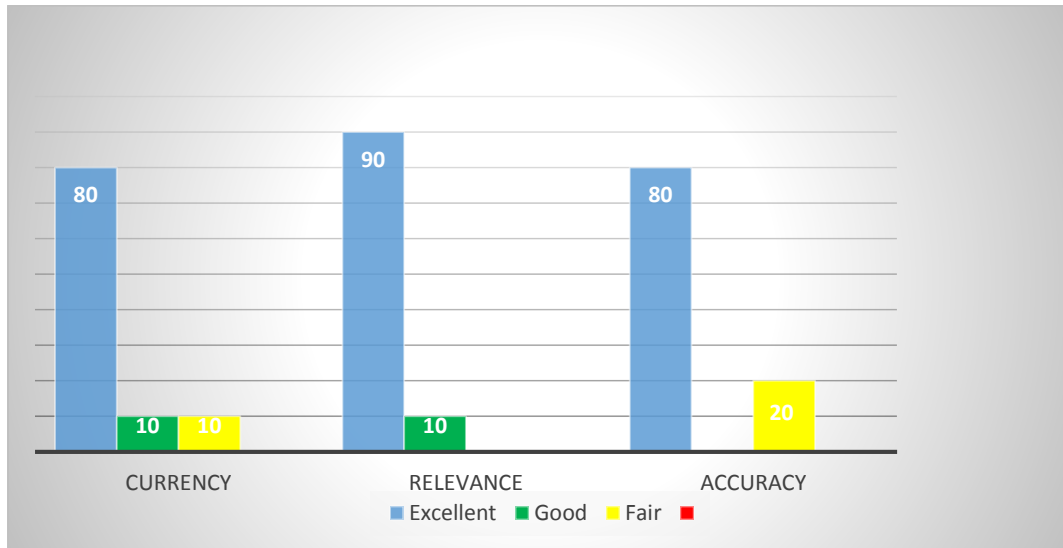
The following criteria were used to evaluate the quality of the contents.

##### **a) Appropriateness of the contents:**

The results of the evaluation checklist showed that all ten participants rated the contents of the simulation learning package as either good or excellent, and it can therefore be considered as appropriate for undergraduate midwifery students.

- b) Clarity of the learning objectives: The findings also revealed that ten participants rated the learning objectives of the simulation learning package to be clearly defined.

Figure 4.1 shows the results of the currency, relevance and accuracy of the contents of the simulation learning package.



**Figure 4.1: The Currency, Relevance and Accuracy of the Contents**

- c) Currency of the information:

With regards to the information contained in the simulation learning package, nine participants reported that the contents of the learning package contained current information, whilst 1 participant rated the currency of the information as fair.

- d) Relevance to the level of the student:

Figure 4.1, shows that all ten participants rated the contents of the simulation learning package as being relevant to the level of the students.

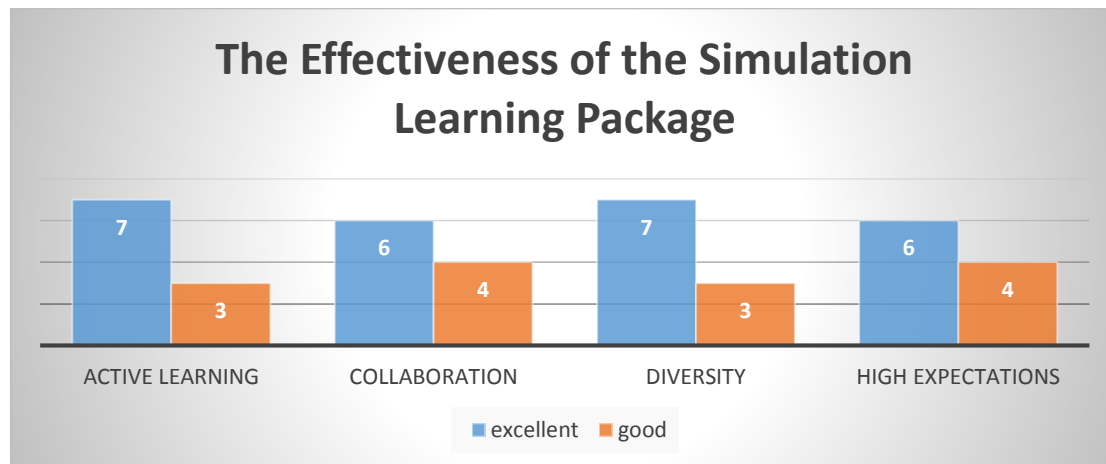
- e) Accuracy of the content:

The graph shows the accuracy of the content contained in the developed simulation learning package on post-partum haemorrhage. The results show that eight participants found the accuracy of the content as excellent and the remaining two participants viewed the accuracy of the content as fair.

In summary, the above results showed that the quality of the contents contained in the simulation learning package was considered to be of a high standard, with a rating of either good or excellent. Therefore, from the feedback received from experts in the field of nursing and midwifery education, the quality of the contents of the simulation learning package on post-partum haemorrhage was found to be appropriate, clear, current, relevant and accurate for undergraduate midwifery students.

#### **4.1.6.2. The Effectiveness of the Simulation Learning Package**

There were five criteria that were used to evaluate the effectiveness of the SLP. These criteria are illustrated in Figure 4.2.



**Figure 4.2: The Effectiveness of the Simulation Learning Package.**

a) Active learning:

As seen in Figure 4.2, the results revealed that all ten participants agreed that active learning strategies were integrated in the SLP.

b) Collaboration:

Findings reveal that six participants rated the package as excellent and four participants rated the package as good. Therefore the overall view of all participants (10/10) felt that the developed simulation learning package promoted collaboration.

c) Diversity in learning:

All participants agreed that the simulation learning package incorporates diverse learning styles. The results revealed that seven participants rated the package as excellent and three of the participants rated the package as good, under the sub-category of diversity in learning.

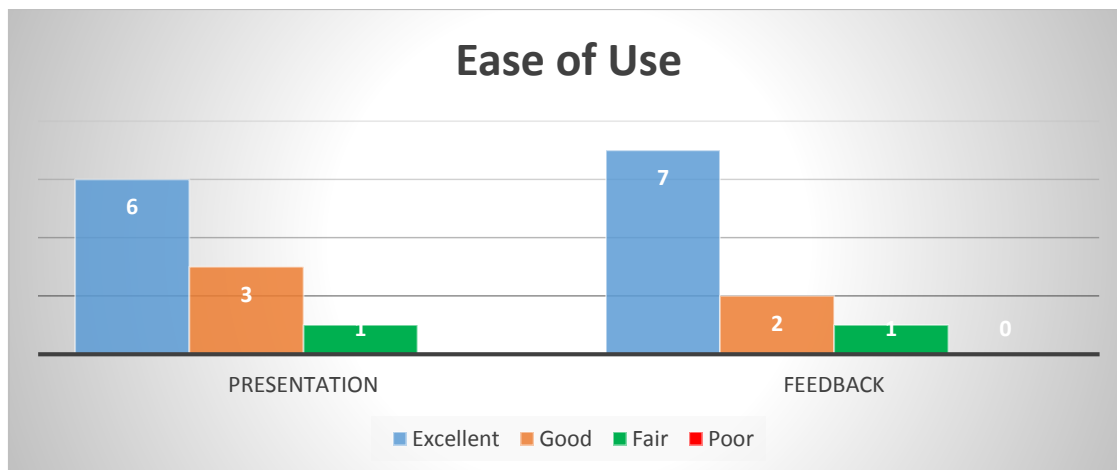
d) High expectations:

The results of the evaluation also showed that six participants rated the package as excellent and four participants rated the package as good. The results therefore indicate that all participants found that the learning objectives of the simulation learning package reflected high expectations for the learner.

In summary, the results of the evaluation checklist showed that the simulation learning package on post-partum haemorrhage designed for undergraduate midwifery students, was strongly evaluated (100%) as incorporating active learning methods, promoting collaboration, promoting high expectations and incorporating diverse learning styles.

**4.1.6.3. Ease of Use**

The last component of the evaluation checklist is the ease of use. This component addresses the way in which the simulation package is presented and the feedback opportunities that are available for students. The findings are illustrated in Figure 4.3.



**Figure 4.3: Ease of Use**

a) Presentation of the package:

The findings of this category show that all participants agree that the package was well presented. Six participants rated the package to be excellent, whilst three participants rated the package as good with regards to presentation.

b) Feedback opportunities:

The results indicate that seven participants evaluated the package as excellent, two as good and 1 one participant rated the feedback as fair. None of the participants rated the package as poor.

In summary, the results revealed thus far showed that the simulation learning package on post-partum haemorrhage was easy to use and offered opportunities for feedback, as agreed by the majority of the experts.

The evaluation checklist included a section for comments which corresponded with quantitative data findings. This corresponding finding highlights the essence of using a mixed methodology. Some of the comments received from the experts are transcribed verbatim and are expressed in the quotes below:

*Excellent. The package is very comprehensive and well written.*

*An excellent learning package, relevant and appropriate for empowering midwives.*

*The simulation package looks good and will definitely be useful in the evaluation of student competencies.*

*The information in the SLP was found to be appropriate for the calibre of the students.*

*Questions are phrased in a way that enhances critical thinking and problem solving skills among the students. Current and innovative strategies are used. The outcomes will surely produce the 21<sup>st</sup> century learner who is innovative and responds well to the needs of the community.*

#### 4.1.7. Summary of Research Question 1

Question: What are the educational practices that should be used in developing a simulation learning package on post-partum haemorrhage for undergraduate midwifery students?

The Nursing Education Simulation Framework, (Jeffries, 2007) was used to guide this study. The Evaluation checklist for experts (Annexure 4), was used to rate the components of the SLP and the results indicate that the SLP developed for undergraduate midwifery students is of a high quality (appropriate, clear, current, relevant and accurate in content); is effective (encompasses major educational practices such as active learning, collaboration, diversity in learning and high expectations of the learners); and easy to use as it allows for feedback opportunities. The educational practices integrated into this simulation learning package can therefore be considered essential in developing a simulation learning package on post-partum haemorrhage for undergraduate midwifery students.

In an integrative review, done by La Fond and Vincent (2012), 16 publications were found that had used the same framework as this study to guide their research- thus proving the value of this framework. La Fond and Vincent (2012) also showed increased student satisfaction, confidence, and improved skill performance by using simulation. In another study done by Smith and Roehrs, (2009), the design characteristics, especially the clear learning objectives, were significantly correlated with student satisfaction and self-confidence. These characteristics, as well as clinical competence and critical thinking, were included in the outcomes of this current study.

In a systematic review done by Adamson (2015) of 153 studies, empirical support for the major components of the NLN/Jeffries Simulation Framework were provided and contributed to its further development.

#### 4.1.8. Revisions to the Draft Simulation Learning Package

General comments regarding the package was that it was innovative, well composed, clearly defined and appropriate for undergraduate midwifery learning outcomes. Specific comments described below, were carefully analysed, selected and integrated into the simulation learning package. Most of the comments were valuable in improving the package and were thus

accepted. The following changes were made to the simulation learning package and are listed below.

1. In the pre-simulation preparation section and under the medications and blood products required, the following changes were made:
  - The dosage of oxytocin was changed from 30 iu to 20 iu IVI, as per the ESMOE Guidelines on the management of post-partum haemorrhage.
  - 1 unit of packed red blood cells was added.
2. In the simulation scenario development - under the storyboard, the following was added:
  - The placenta was delivered complete and healthy.
3. Under the operator instructions for unexpected or inadequate actions, the following changes were made:
  - The heart rate was increased to 130bpm.
  - The blood pressure was decreased to 80/50.
4. Under the scenario specific guidelines on pages 10, 11 and 12:
  - Critical points were highlighted and hence critical omission was linked to the different pathways expected to be used by the students.
  - Step 2 No.2 was prioritised and placed under Step 1, No. 3.
  - Check Circulation, Airway and Breathing (CAB) was included in the management under Step 1 and as part of No.3.

On the completion of revisions to the simulation learning package, the researcher proceeded to make preparations for the practice run of the simulation.

#### 4.1.9. The Practice Run

##### **4.1.9.1. The Process**

The clinical skills laboratory maternity station was the venue that was booked for the practice run of the post-partum haemorrhage simulation. Staff members (one, an advanced midwife and the other, a programme co-ordinator) were requested via e-mail to assist in the practice run as facilitators. Three advanced midwives currently working in a labour ward setting, in the

different clinical areas, were invited to attend the practice run. The technicians responsible for the setting up of the high fidelity simulators were also invited. The storyboard, action cards and documents needed were printed and kept available for use.

The set-up for the scenario practice run was arranged, as per the pre-simulation preparation on pages 5 and 6 of the Simulation Learning Package on Post-partum Haemorrhage. The expectations of each role-player were outlined on action cards.

Upon arrival of all the role-players, a briefing was conducted, the storyboard was read by the researcher and the participants were given their action cards. One clinical practitioner participated as student 1 (the team leader). Another clinical practitioner participated as student 2 (the husband), the 3<sup>rd</sup> clinical practitioner played the role of student 3 (the junior student) and the researcher played the role of student 4 (a junior student). The video-recorder set up was done by Technician 2 and the computer and mannequin set up and programming (SimMom) was done by Technician 1. When both technicians were ready, the timer was started and the scenario commenced. All role players were actively involved and followed the appropriate and expected actions. This was to be expected since all role-players were practicing, advanced midwives. The scenario commenced with the team leader responding to the call of the birth companion. This was followed by the team leader assessing the blood loss and making a diagnosis of post-partum haemorrhage. The team leader then called for assistance and the team managed the patient following the correct/ appropriate pathway. The technician and the researcher assessed the steps taken and made the trigger changes as necessary. The practice run was completed in 7 minutes and 26 seconds. Following the practice run, a debriefing session was held and feedback regarding the simulation was obtained. The technicians were satisfied with the technical functioning of the equipment, however, the monitor (for student's viewing) was too far away from the videographer and from the scenario. Comments from the clinical specialist were that the room setting should be more realistic and more supplies and emergency equipment should be available.

#### **4.1.9.2. The Feedback**

The feedback received from the technicians and clinical practitioners is highlighted below:



1. The room set up for the scenario needed to be moved to accommodate a video conferencing set up for observing participants;
2. A second camera was needed to view the information seen on the vital signs monitor;
3. A red bin was to be available for the disposal of biohazardous waste materials;
4. The placenta was to be visible in the scenario, in case the students wanted to examine it for completeness;
5. A trolley for catheterisation needed be available with the equipment;
6. An emergency trolley needed to be included as this was an obstetric emergency;
7. More supplies such as disposable aprons, sterile gloves, suture materials, transpore tape to secure the IV lines and a cuscoes (speculum) were required;
8. In the scenario itself, one person was needed for recordkeeping and one person was required to play the role of the doctor who would arrive at the end of the scenario; and
9. Trolleys were to be labelled so that they could be identified on the video.

These additional changes, specifically regarding practical issues were considered when revising the simulation learning package further. The simulation learning package was then saved and printed as the final copy.

#### 4.1.10. The Researcher's Journey into Developing the SLP on Post-Partum Haemorrhage

Designing a simulation learning package (SLP) was a demanding yet powerful learning experience. It was initially assumed by the researcher to be a simple task, however, from searching the literature, the researcher identified that developing a simulation learning package required passion and a great amount of research and planning. The researcher was forced to engage with high fidelity simulation on a regular basis, in order to become familiar and comfortable with using high technology equipment. The researcher chose to use high fidelity simulation because of its complex, 'life-like' nature which allowed students to become immersed in a scenario on post-partum haemorrhage; where they were expected to use all of their skills to assess, diagnose and manage a patient. Ausubel's meaningful learning theory suggests that students learn new, meaningful ideas by subsuming themselves into their existing cognitive structures, (Bruce, Kloppe & Mellish, 2011). The way that nurse educators organise and present course content and lecture material is therefore instrumental to the

basic and pre-existing knowledge of students, according to Bruce, Klopper and Mellish. These researchers add that Ausubel's model distinguishes between two types of learning by emphasising that rote learning can be converted to meaningful learning; and reception learning to discovery learning; by making the learning situation more meaningful (Bruce, Klopper & Mellish, 2011). For the researcher of this study, developing the SLP on post-partum haemorrhage was an authentic experience. It felt like the teacher was bringing the clinical setting to the classroom. This was especially true, firstly because the CSL setting was similar to a real life labour ward setting and secondly, because the implementation of the designed scenario story board and expectations for the role-players during the practice run made the situation even more realistic. This thus really promoted the integration of theory and practice.

Developing an SLP was, however, no easy task and was met with many challenges. Some logistical setbacks identified when running the scenario session were that lecturers were reluctant to be involved in the process and therefore offered minimal support to the researcher. This was probably due to a lack of confidence in using high fidelity simulation. In a study done by Sinclair and Ferguson, (2009), the results indicated that many staff members do not feel competent to use simulation strategies. Most of the participants in this study felt that the development of a simulation module for lecturers would increase their confidence.

Time constraints were another major problem experienced because the time needed to develop and run the simulation was initially severely underestimated by the researcher. Similar limitations were seen in studies done by Bremner et al. (2006), Nevin, Neill and Mulkerrin (2014) and Valadares and Magro (2014).

The developed SLP was invaluable to the researcher in terms of developing the researcher's skills as an educator, as this was the first and only SLP designed in the School and could possibly be used in future as a tool for designing more SLP's.

#### 4.2. Phase 2: Implementation of the Simulation Package

The setting chosen to implement the SLP was the clinical skills laboratory at the University of KwaZulu-Natal, where the researcher was employed as a tutor, and was teaching midwifery

to the 4<sup>th</sup> year nursing students in the undergraduate programme. The researcher chose this venue because it was a well-established clinical skills laboratory that catered for both nursing and medical students to practice their clinical skills. It was considered to be an ideal venue, as access to the high fidelity simulators such as the 'SimMom' was available for teaching purposes. The researcher chose to develop an SLP on post-partum haemorrhage because of its complexity in the management process. The use of such an approach could encourage active participation, diverse learning strategies, collaboration, high expectations and opportunities for feedback, as found by Jeffries (2007).

The implementation of the simulation learning package commenced with pre-simulation preparation, followed by a briefing session which included participants, facilitators and technicians before the simulation session. This was followed by the scenario session on post-partum haemorrhage and concluded with a debriefing session. These various stages are described in detail in section 4.2.1.

#### 4.2.1. Pre- Simulation Preparation

The implementation phase began with the researcher making appointments with the various potential role-players who showed an interest to participate in the simulation session. The technicians and facilitators were informed via e-mail of the intent to conduct the simulation session. Students were also informed of the impending session and a pre-requisite list was posted via the on-line learning website. Students were also asked to wear uniforms. The intention of the researcher was to create an authentic experience by ensuring that the scenario session was as realistic as possible. All the necessary arrangements such as the booking of the venue and the equipment needed were made. The station design was moved adjacent to the classroom so that observing participants, who were also 4<sup>th</sup> year students, would be able to view the scenario whilst seated comfortably in the classroom. The station was prepared as per the pre-simulation set up on pages five and six of the simulation learning package. All the necessary documentation was printed and kept in readiness for the day of the final simulation session.

On the morning of the simulation session, all of the 4<sup>th</sup> year undergraduate students were informed of the time and venue of the simulation session. They were asked to report to the venue, namely the skill laboratory classroom, for a briefing session. Forty- three out of the fifty expected students arrived at the venue. The technician responsible for the video conference set up was available an hour before the commencement of the simulation session. A video signal of the scenario setting was transmitted to an adjacent classroom, for the convenience of the observers of the simulation session. The picture quality of the station on a projector screen in the classroom was clear and of a high quality. Upon the arrival of the research assistant and videographer, the students were welcomed and introduced to the simulation experience. Once the set-up had been prepared, the researcher commenced briefing all of the participants.

#### 4.2.2. The Briefing Session

The outline of the briefing session is stated below:

1. A welcome and introduction of self was done;
2. The purpose of the study was explained;
3. The technicians, facilitators and the research assistant were introduced;
4. The information sheet was read out to all students;
5. Voluntary participation in the study was emphasised;
6. The simulation process was described;
7. The use of video-recording during the scenario was re-iterated;
8. The value of a consent form was emphasised; and
9. Questions/ concerns/ queries were requested from the students.

All students present were very excited and agreeable to participate in the simulation session on post-partum haemorrhage. The consent forms were distributed and collected by a facilitator and the research assistant. Participants were then informed of the ground rules and the expectations of them during and after the simulation session. The briefing session lasted approximately ten minutes.

Participants who volunteered to be in the role-play were grouped into two groups of six students each. Group A consisted of four male and two female students. Group B consisted of four female and two male students. Refer to Table 4.3.

**Table 4.3: Demographics of the Role-Players**

Role-players	Group A	Group B
Team leader	Female	Female
Assistant 1	Male	Female
Assistant 2	Male	Female
Husband	Male	Male
Doctor	Male	Male
Enrolled Nurse	Female	Female

Group A was sent to the simulation station and the remaining participants remained in the classroom as observers to the simulation session on post-partum haemorrhage. Observers were able to view the scenario via a video conference set-up.

#### 4.2.3. The Scenario on Post-Partum Haemorrhage

All participants seemed excited to be involved in the simulation session. **Group A** proceeded to the station where the ‘Sim Mom’ was set up for the scenario on post-partum haemorrhage. The researcher explained the set up to the group and read the storyboard loudly. Action cards which indicated the role and expectations of role-players during the scenario were issued to the participants. Participants were allowed five minutes to read and discuss their roles. The researcher was available to answer any questions or concerns. When all of the participants were ready, a ‘thumbs- up’ was given to the technician and the videographer, and the timer was started.

The scenario commenced with the husband shouting for assistance and the team leader responding promptly. The team leader then reassured the patient and the partner, and identified the problem of post-partum haemorrhage. She then called for assistance and her team members responded timeously. As the scenario progressed, it was evident that the participants were undertaking appropriate measures. In step 1, all eight critical points were addressed within three minutes. Technician 2 and facilitator 3 monitored the progress, as per the guidelines on page ten of the simulation learning package. The trigger action was implemented after three minutes, as planned. Students were able to identify the haemodynamic changes in the patient. They proceeded to Step 2 and were able to carry out five of the six critical points in managing the patient. The 6<sup>th</sup> critical point was, however, mentioned 25 seconds later.

The 2<sup>nd</sup> trigger commenced timeously at six minutes and adjusted according the pathway taken. This group of participants managed the scenario according to the expected and appropriate outcomes. The scenario lasted 13 minutes and 17 seconds. At the end of the session, participants were sent to the classroom. **Group A** joined the rest of the participants and **Group B** proceeded to the scenario station.

The researcher followed the same processes for **Group B**. The scenario began with the husband shouting for a nurse. The team leader responded and the relative verbalised that his wife appeared pale. The team leader called for assistance and the team responded to the team leader. In this scenario, the team leader asked the husband to wait outside the room while they were managing the patient. The scenario progressed much faster and according to the interventions noted in Step 1. The performance was monitored by both facilitator 3 and technician 2 (refer to the guidelines on page 10, 11 and 12 of the SLP). The triggers at three minutes and at then again at six minutes were carried out as planned. The team was able to complete the correct and appropriate intervention within the time limits. The scenario ended with the doctor informing the husband of the progress of the patient at the end of the procedure. The scenario for Group B lasted eight minutes and 52 seconds. **Group B** then returned to the classroom for a debriefing session.

The participants performed well in their roles. In both teams, the team leaders were the anchors of the team and were able to manage the team well. They were able to delegate tasks to the team members, who were very co-operative. Both teams managed the patient according to the expected pathways and both teams appeared confident in their roles and comfortable within the teams. **Group B** appeared more confident and more efficient than **Group A** and this can be attributed to the fact that they witnessed the performance of **Group A** and tried to improve the performance of that group. Although both groups took different stances to manage the patient, especially in respect of the presence of the husband, both groups maintained the principles of management and showed a holistic nursing approach.

#### 4.2.4. The Observations of the Recorded Video Session

Students were given roles to play which included the primary nurse, patient's spouse, nursing assistants and the doctor. Background information was given on the story board and the students began the scenario. A lecture on the topic, which included the management of PPH, was conducted with students two weeks before the simulation session. The purpose of conducting the lecture and allowing students time to practice before proceeding to the simulation session, was to identify how students were able to apply their knowledge by remembering and recalling the information. Active participation affords the educator an opportunity to assess the problem solving and decision making skills of learners within the simulation experience (Jeffries, 2007). This method of learning promotes cognitive functioning and allows students to become actively involved in the learning experience whilst taking responsibility for their actions, add Bruce et al (2011). Active learning is an important characteristic of adult learning. Malcolm Knowles's, androgogic learning, implies that adult learners assume a degree of autonomy and self-determination. According to Knowles, five assumptions exist in adult learning which are: self-concept, experience, readiness to learn, orientation to learning and motivation to learn. Bruce et al (2011) suggest that these five assumptions can be applied to student nurses as for adult learners.

According to Jeffries (2007), active engagement in the learning process is important when designing and using simulation. In this study, 4<sup>th</sup> year students participated in a simulation session on post-partum haemorrhage. Their voluntary participation speaks to their self-

concept and willingness to learn. Their actions/performance shows off their clinical and learning experience, as well as their orientation and motivation to learn. In this study, students were enthusiastic about participating in the simulation scenario as they were well orientated to the topic concerned (PPH) and the use of HFS (SimMom).

Upon viewing the video recording of the simulation, a slight degree of anxiety appeared to be present as the participants of **Group A** were observed standing together and whispering at the onset of the session. This was expected as this was their first exposure to this kind of learning, and they were aware that they were being video recorded. This anxiety decreased as the session progressed and students were required to be actively involved in managing the patient. Their active participation thus encouraged active learning strategies. As the students showed more confidence in managing this patient, their levels of anxiety seemed to decrease. **Group B** had already seen the performance of **Group A** and started the scenario very confidently. Nevertheless, both groups of students looked excited and enthusiastic to be in the role-play despite their awareness that their performance was being viewed by facilitators and their colleagues.

In this study, nursing theory and practice was integrated through a process of experiential learning and can be explained using Kolb's experiential learning theory. Through experiential learning, a link between classroom learning and the real working world becomes possible (Kolb, 1984).

According to Kolb (1984) information processing and learning occurs in cycles and this process starts with concrete experiences whereby students immerse themselves fully into a new experience that they consider to be stimulating or challenging. The second phase of reflective observation occurs when students observe and reflect on their concrete experience. This is followed by the creation of logical theories through the integration of observation, which is termed as an abstract conceptualisation. The last stage which is active experimentation is when students apply these new theories during decision-making and problem-solving activities, (Hughes and Quinn, 2013).



From the observations of the simulation video, it was seen that participants were able to apply theoretical knowledge to practice. These results also showed that participants understood the management guidelines and therefore were able to make good decisions regarding the steps to be followed (concrete experience). High fidelity human patient simulation currently offers a unique opportunity for situated learning, where students are able to practice realistic scenarios and become fully immersed in the situation. Technology-proficient students are excited by simulation, which requires the coordination of cognitive, affective, and psychomotor skills. This type of learning promotes high expectations for both the learners and the educators (Jeffries & Norton, 2005). Butler and Veltre (2009) found that students who participated in HFS learning, perceived the simulation as having a greater impact on their problem-solving ability and made their learning time more active and productive. The findings from the observations of the video also support the findings of Butler and Veltre (2009) which demonstrate the value of simulation in creating active learning opportunities and supporting best practices in the undergraduate education programmes.

The interrelationship between behaviour, environment and personal factors, with each factor dependent on the other, is well explained in Vygotsky's social cognitive learning. According to Vygotsky, cited in Bruce, Klopper and Mellish (2011); all higher mental functions have their origins in social interactions. One of the central concepts in Vygotsky's theory, as related to this study, is the zone of proximal development which represents the distance between the student's actual level of development, seen in independent problem solving, and their potential level of development, as seen in their collaboration with peers. This type of learning must, however, be guided until the student is able to guide themselves through the internal mental processes referred to as scaffolding. Scaffolding is the gradual reduction of the guidance offered to students, as their level of development in learning increases (Bruce et al, 2011).

The observations of the simulation video emphasised the importance of group dynamic processes which are linked to collaborative learning strategies. The observations showed that students enjoyed working together in the groups. This was evident by students' behaviour in

the simulation sessions. They worked hand in hand as they tried to remind each other of what to do next (which was evidenced by occasional nudging and eye movements). They were also very compliant to the requests of the team leader (who was their peer) in both groups. Team members showed a lot of respect for each other within the group; which was also part of the ground rules. All students were actively involved in the management of the patient as the team leader delegated tasks to all team members. As the scenario progressed, team members continuously checked and verbalised the patient's condition loudly, for the benefit of the team. All students showed extreme excitement when their patient's condition improved.

Similar findings were seen in a study done by Bray et al. (2009), who found that students can practice teamwork principles during the scenarios, which can improve patient care and safety. According to Shapiro et al. (2004), high fidelity simulation appears to be a promising method to enhance teamwork training, and proposed this as an approach to training as it is more representative of the clinical area.

The scenario on post-partum haemorrhage is a complex scenario that requires prompt decision making skills in order to be able to save the life of the patient. In this scenario, there were three pathways that could be followed. Critical points in the management guidelines were related to the outcomes of the scenario. The first pathway consisted of the correct and appropriate management, with an outcome where the patient recovered. The second pathway was inadequate and the patient's outcome remained the same. The third pathway was incorrect and inappropriate, and resulted in the death of the patient. In both of these scenarios, students from both groups were able to diagnose and treat the patient by examining the clinical signs and observations. Students were able to make decisions on the spot as they proceeded with steps in managing the patient. The students intermittently reassessed vital signs to identify whether their patient's condition was improving or not and then, depending on their findings, they were able to proceed further. Both groups chose the first pathway and their patient recovered. This showed good critical thinking abilities as the students were able to think through their findings and make a group decision for the total wellbeing of the patient.

Harder (2009) claims that role-playing, case scenarios, and simulations are educational strategies believed to provide a vital bridge to practice and thus increase confidence. Critical thinking is defined as thought processes that require analysis and synthesis of information, and is a pre-requisite for the development of clinical judgement (Brown & Chronister, 2009). Huitt (1998) asserts that the development of critical thinking is enhanced by exposing students to both theoretical teaching and experiential learning.

#### 4.2.5. The Debriefing Following the Simulation Scenario Session

The aim of this session was to provide learners with an opportunity to talk about their experiences (both as participants and as observers) in the simulation scenario, interpret their own actions and/or decisions and those of their peers, identify any gaps in the management that was critical to the outcome of the patient and make recommendations for improvements.

According to Sundler, Petterson and Berglund (2015), students develop their skills and competencies by working with other students and through the feedback and reflections given after the scenario. Reflections and discussions with other students have been reported as aspects meaningful for nursing students' learning by Westin, Sundler and Berglund (2015). Debriefing encourages a theory of constructivist learning as it creates a platform to evaluate learning experience, thus creating an opportunity to reformat knowledge based on new experience (Bruce et al, 2011).

Guided reflections can improve knowledge and skills, and we can argue that using visual feedback may be important to improve the students' development of knowledge and skills even more. In a study done by Thidemann and Soderhamn (2013), reported that improved practical, communication and collaboration skills, through experiencing the role of the nurse which may possibly bridge the gap between theory and practice and therefore contribute to the development of reflective and critical thinking skills.

In this study, pre-written questions were used to guide the debriefing session, (see Annexure 8). The debriefing session commenced in a classroom nearby the clinical skills laboratory and

included both the role-players and the observers. The researcher explained the process to the participants and asked permission for the session to be audio recorded. The facilitator was available to respond to any comments and concerns.

Forty-three participants (students) and three facilitators were available to provide feedback on the simulation scenario for post-partum haemorrhage. The participants of the session responded using a critical evaluation approach. This approach is a common practice when evaluating midwifery class presentations, and it was identified that students applied the same principles when they were evaluating the scenario session on post-partum haemorrhage.

According to Tanner (2006), reflections, both on-action and in-action, are equal to the reflective observation phase as described in the experiential learning process. During reflection-in-action, student are able to identify responses and changes in patients' conditions and adjust their nursing interventions accordingly. During reflection-on-action, students are able to reflect on their performance after the clinical experience learning and thus completes the cycle. Waldner and Olson (2007) showed that experiential learning is enriched when students are allowed to reflect on their experience since reflection and feedback promotes the integration of theory and practice through the development of critical thinking. When the students reflect on their experience, critical thinking abilities are developed and it is during these sessions that students, as adult learners, conceptualise and reconstruct their own cognitive frameworks, (Waldner and Olson, 2007).

#### **4.2.5.1. Results of the Debriefing Session**

It should be noted that the excerpts that are quoted in this chapter are verbatim transcriptions of the participants' words. Most comments received in the debriefing session suggested that the simulation scenario was interesting, that it tested their knowledge and skills, and it showed that the role-players were confident. One student commented:

*I think it will be more helpful because it is easy to remember something if you practiced it. It gives you confidence to use it in the clinical setting with real patients.*

Another student said:

*It is useful, it helped me test my knowledge and I gained more experience in managing a patient with post-partum haemorrhage.*

According to Berragan (2013), the contribution of simulation has primarily been positive and may have the potential to offer a learning environment in which students begin to practise nursing and develop nursing skills and competences. In a study done by Hope, Garside and Prescott (2011), students reported positive responses to simulation as a learning strategy, and added that simulation offers students a safe environment for learning that enhances clinical competence without the risk of harming patients. Nevin, Neill and Mulkerrin (2014) found that students found the simulation sessions realistic and useful in... *developing clinical skills, knowledge and confidence for clinical practice.*

Other comments received from students implied that the simulation was an authentic experience and the visual learning caught their attention as students were focused when watching the scenario via video conferencing.

One participant commented:

*Audio-visuals grab the attention of viewers and are a good way to get students involved in group work.*

Sundler, Petterson and Berglund (2015) also found that high fidelity patient simulators can make the simulation authentic, and that visual and verbal reflections and feedback were significant for the student's learning. Bland, Topping and Wood (2011) had previously qualified that in order for simulation to be effective, it had to reflect reality.

Despite the many positive comments received from students regarding the simulation in this study, some negative comments included that the sound in the classroom needed improvement, the waste paper bin should have been closer to the patient's bedside and that the partner should have waited outside of the scenario.

The negative feedback received was very important to the researcher as it enabled the identification of gaps in the simulation session. The sound system and the closeness of the waste disposal bin will be considered when setting the scenario in future teaching sessions.

The results indicate that the scenario caught the full attention of the observers. Active listening was also evident as feedback received was constructive and integrated comments relating to both the positive and negative aspects of the scenario and the role-players. It was evident during the debriefing session that students were knowledgeable about general infection control principles in nursing care, and were able to identify improper waste disposal; which was an oversight in their role-players' management of the patient. A deeper understanding also infers that students at the 4<sup>th</sup> year level are conscientious learners and have high expectations for their learning needs. They were able to critically analyse the scenario and make decisions based upon the clinical signs of the patient. This is expected of them when critically analysing nursing care rendered during case presentations. The comments relating to the presence of the partner in the scenario during the management process actually turned out to be a controversial issue. Some participants felt that this was an obstetrical emergency and so the relative should have waited outside the room, whilst others felt that the relative should remain with his wife for psychological reassurance and as part of the "Mother and Baby Friendly Initiative," (WHO, 1991), which advocates the need of a birth companion.

#### 4.2.6. Feedback from Facilitators

The first comment received from one of the facilitators on arrival at the CSL was:

*Seems like we are in the labour ward.*

This feedback received from this facilitator showed that the simulation set-up appeared to be authentic, as it represented a realistic labour ward room with a patient, emergency equipment and supplies, and a registered midwife with students who were in full uniform.

Comments also suggested that participants seemed enthusiastic to be involved in the role-play. They were eager, volunteered quickly and were excited as they listened very carefully to the facilitator who read out of the story board and the expectations of them. Students were knowledgeable, skilful and confident in using high fidelity simulation, which reinforced their comfort levels as they were exposed to using it previously.

Another facilitator commented:

*Students were very professional in their behaviour, and performance was excellent.*

Simulation provides students with an opportunity to develop clinical judgment and affords the faculty a chance to observe students' clinical decision making and practice in a confined, prescribed setting (Lasater, 2007; Rourke, Schmidt, & Garga, 2010; Mikasa, Cicero & Adamson, 2013).

The facilitators reported hearing a muffled background sound in the classroom during the simulation, but the voices of the role-players were still quite audible. Despite this, the facilitators felt it was an excellent way to assess competencies in managing obstetrical emergencies. They added that simulation training granted the students the time and the opportunity to practice and master their skills in preparation for community service placement.

These reflections show that both the students and the facilitators shared similar views relating to the scenario role-play on post-partum haemorrhage. The role play on post-partum haemorrhage was effective in contributing to the various skills that were brought out during the scenario session. Students were able to enjoy what they were doing whilst achieving their learning outcomes.

The debriefing session concluded with the participants completing a student satisfaction survey, which will be analysed and discussed in Phase 3 of the study.

#### 4.3. Phase 3: Evaluation of the Simulation Learning Package

The evaluation of the simulation learning package is the last phase of this study. It comprises the results of a student satisfaction survey which consist of Sections A and B, and the results of a focus group discussion. The results of the focus group are views of students who participated in the role play as well as from students who were observing the simulation scenario.

##### 4.3.1. Results of Section A of the Student Satisfaction Survey

A Student satisfaction survey, using a 5 point Likert scale, was used to assess the outcomes of the simulation scenario. 43 participants completed and returned the forms. The response rate was 100%. Participants consisted of seven males and 36 females. The age values ranged from 21-35 years of age. The views relating to the pre-simulation preparation and the outcomes of

the simulation scenario were measured using a student satisfaction survey and the results were analysed using SPSS Version 23 and are presented in Table 4.4.

**Table 4.4: Results of Section A of the Student Satisfaction Survey**

VIEWS RELATING TO THE SIMULATION TRAINING	Strongly Agree		Agree		Unsure		Disagree		Strongly Disagree		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
<b>Pre-Simulation Support</b>												
a. The support materials I received before attending the simulation session prepared me for the session	24	56	18	42	1	2	0	0	0	0	43	100
b. The support materials I received were well structured	21	49	21	49	1	2	0	0	0	0	43	100
c. The support materials I received were easy to follow	20	46.5	19	44	4	9.5	0	0	0	0	43	100
d. The websites I accessed before I attended the simulation session were useful in preparing me for participating in the simulation session	17	40	18	42	8	18	0	0	0	0	43	100
e. I needed more support with the preparation for this session	2	5	11	25.5	11	25.5	14	32	5	11	43	100
<b>Post- Simulation Outcomes</b>												
f. The simulation process was helpful in understanding the core clinical skills in managing a critically ill patient in a safe environment	29	67	13	30	1	2	0	0	0	0	43	100
g. The simulation scenario allowed me to test my knowledge to an appropriate level of nursing care for a critically ill patient	25	58	17	40	1	2	0	0	0	0	43	100
h. The simulation scenario allowed me to demonstrate clinical decision-making skills	22	51	20	47	1	2	0	0	0	0	43	100



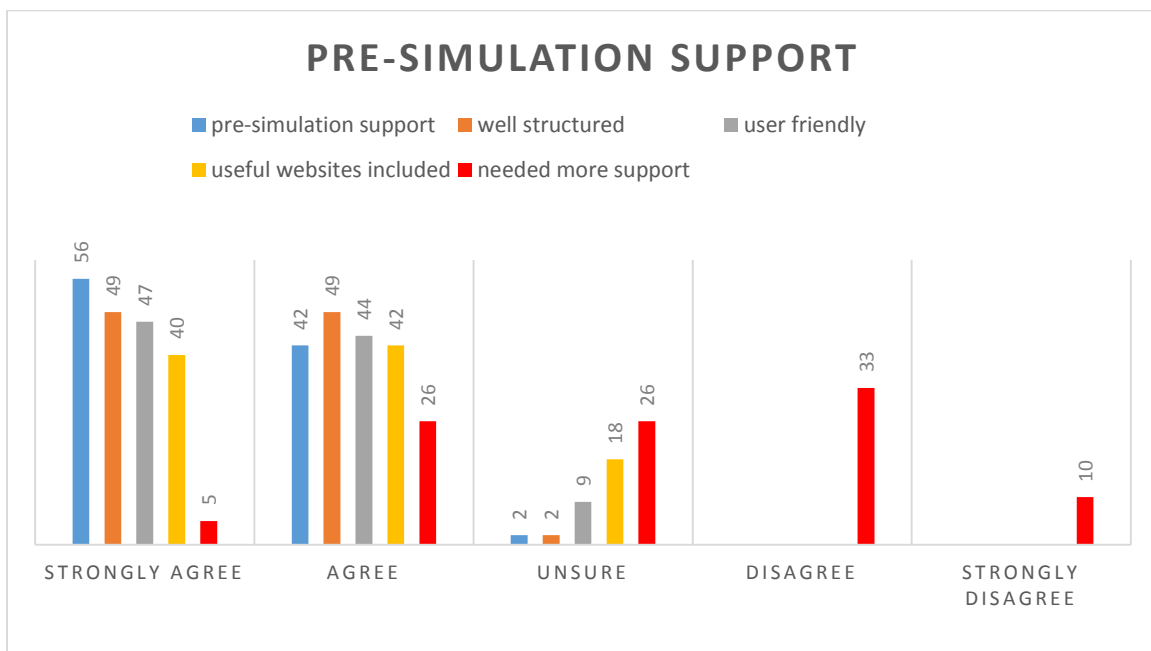
i.	I am confident that I will be able to use the knowledge gained from this simulation session in clinical practice	30	70	12	28	1	2	0	0	0	0	43	100
j.	The simulation session has aided my understanding and I feel I have achieved my learning outcomes	27	63	16	37	0	0	0	0	0	0	43	100

The results of Table 4.4 are discussed independently and then grouped into:

1. Pre-simulation support, and
2. Post simulation outcomes

#### **4.3.1.1. Pre-Simulation Support**

Students were prepared for the simulation by means of a class presentation on post-partum haemorrhage, clinical demonstrations on the management process of the condition and references to relevant websites. Figure 4.4 illustrates the results of the pre-simulation support section of the student satisfaction survey (a-e), and is measured in percentages.



**Figure 4.4: Pre-Simulation Support**

- a. The results from the pre-simulation support show that 98% of the participants agreed that the support material they received prepared them for the session and 2% of the participants were unsure. These findings are significant, as they show that the majority of the participants were satisfied with the support material received. It is therefore safe to deduce that the materials received were appropriate and relevant to prepare the participants sufficiently for the session.
- b. The majority of the participants (98%) agreed that the support material they received was well structured. Two percent (2%) remained unsure about the structure of the support material received. This means that the support material received was well structured and suitable for undergraduate midwifery students.
- c. The findings reveal that 90.5% agreed that the support material was easy to follow. Only 9.5% of the students were unsure about the ease of use of the support material received. The data finding relates that the support material received was user friendly, well-defined and systematic.
- d. The results show that 82 % of the participants were in agreement that the websites accessed before attending the sessions were useful in preparing them for participation in the simulation session. The findings reveal different websites were accessed, and that the majority of the participants agreed that these websites were helpful to prepare them for the simulation session. 18 students were unsure about the usefulness of the websites accessed.
- e. The finding related to the need for more support in preparation for the simulation session, shows that 31% agreed that they needed more support, 26% were unsure and 43% disagreed. Although 43 % of participants did not need more support, the majority of the participants expressed that they either needed more help or were unsure about their needs related to this aspect.

The results of the pre-simulation support are outlined in numbers and means in Table 4.5.

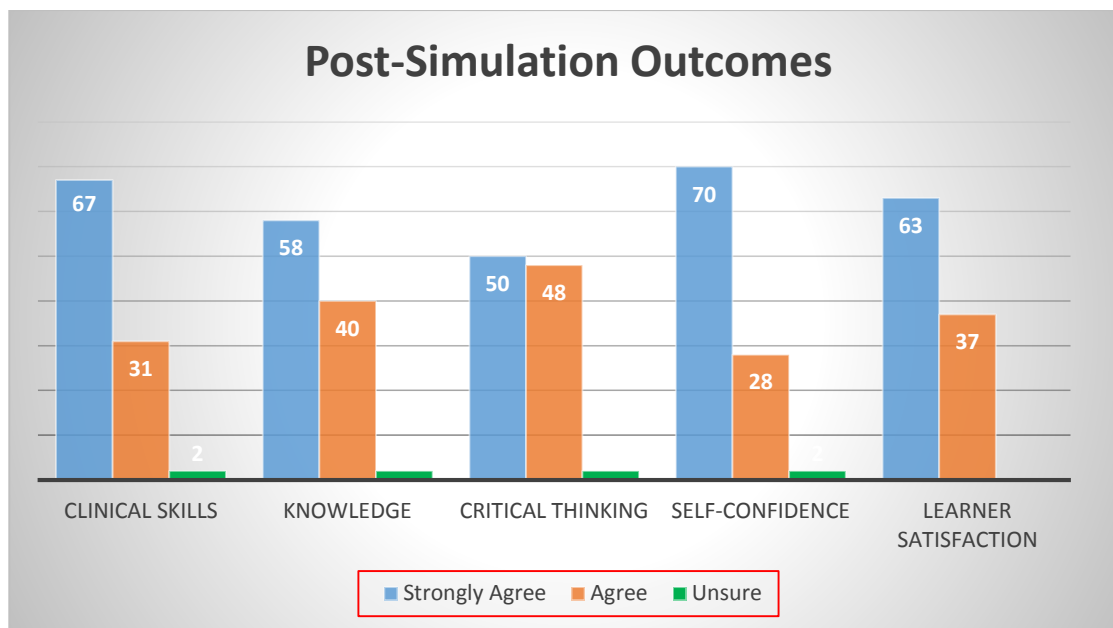
**Table 4.5: Results Related to Pre-Simulation Support Received**

Support material received	Mean	4.5349
	N	43
Well- structured support material	Mean	4.4651
	N	43
Easy to follow	Mean	4.3721
	N	43
Useful websites accessed	Mean	4.2093
	N	43
Needed more support	Mean	2.7442
	N	43

The overall findings reveal that the mean values across the first 4 factors of the pre-simulation preparation ranged between 4.2 and 4.5, which is significantly high. The 'need for more support' displayed a mean value of 2.7442, which was low. The results suggest that although the pre-simulation support was considered to be adequate, well structured, easy to follow, and included access to useful websites, a significant proportion of the students (31%) felt that they needed more support before the simulation session. In a study done by Weller (2014), results showed that although students were prepared by the completion of class activities and clinical demonstrations, the participants felt that they were unprepared for the simulation due to a lack of prerequisite knowledge, which influenced their simulation experience in a negative manner. It is therefore important that students are adequately prepared before participating in simulation sessions.

#### 4.3.1.2. Post-Simulation Outcomes

The results of the outcomes of the simulation session determined by the student satisfaction survey (f-j) were analysed and interpreted. The graph below (Figure 4.5) reveals the outcomes of the simulation session, expressed in percentages.



**Figure 4.5: The Outcomes of the Simulation Session**

- f. Clinical skills: Ninety eight percent (98%) of the participants agreed that the simulation process was helpful in understanding the clinical skills required to manage a patient suffering from PPH in a safe environment.
- g. Knowledge: Ninety eight percent (98%) of the participants agreed that the scenario allowed them to test their knowledge of the nursing care required for a patient to an appropriate level.
- h. Critical thinking: Ninety eight percent (98%) of the participants agreed that the simulation scenario allowed them to demonstrate clinical decision making skills.
- i. Self-confidence: Ninety eight percent (98%) of the participants agreed that they were confident that they would apply the knowledge gained from this simulation session effectively in clinical practice.
- j. Learner satisfaction: There was a 100% satisfaction, as all 43(n) participants agreed that they were satisfied with the simulation session.

Table 4.6 shows a comparison of the pre-simulation and post simulation scores of the student satisfaction survey.

**Table 4.6: Scores of the Student Satisfaction Survey**

		Total Satisfaction	Pre-Simulation Satisfaction	Post-Simulation satisfaction
N	Valid	43	43	43
	Missing	0	0	0
Median		44.0000	21.0000	23.0000
Mode		44.00 <sup>a</sup>	21.00	25.00
Minimum		36.00	14.00	18.00
Maximum		50.00	25.00	25.00
Percentiles	25	41.0000	19.0000	22.0000
	50	44.0000	21.0000	23.0000
	75	46.0000	22.0000	25.0000

This table shows that all post-simulation satisfaction scores were found to be higher than the pre-simulation satisfaction scores, with the highest satisfaction score of 46 falling within the 75<sup>th</sup> percentile.

The findings suggest that the majority of the student satisfaction scores were above the 75<sup>th</sup> percentile and implies that the simulation session on post-partum haemorrhage was a good way to evaluate learning outcomes in terms of the clinical skills, knowledge, decision-making skills, the levels of self-confidence and learner satisfaction.

In a study conducted by Moule, Wilford, Sales and Lockyer (2008), it was also reported that students demonstrated an increase in knowledge, skills and self-confidence; and those authors recommended that simulations be incorporated into the curriculum. In more recent studies, Valadares and Magro (2014) obtained similar findings, as did Nevin, Neill and Mulkerins (2014); Mikasa, Cicero and Adamson (2013); Sundler, Petterson, Berglund (2015).

The students who participated in this study were fourth year midwifery students, who were expected to function as registered nurses during their first year of community service obligation. It is advantageous to them to master the management of various critical conditions using high fidelity simulation, so that when they are faced with such emergencies during their maternity rotation, they feel confident to carry out the relevant procedures.

#### 4.3.2. The results of Section B of the Student Satisfaction Survey

Section B of the student satisfaction survey consisted of two open-ended questions that were analysed using the concept of content analysis. This analysis focused on the discernible content and described the visible and obvious components of the text.

There were four categories that emerged from the data, as explained further:

##### **4.3.2.1. Acquisition of Knowledge**

The findings show that the majority of the participants felt that they had gained knowledge from participating in the simulation session. Some of the many related comments received are highlighted below.

*I gained knowledge from the simulation and achieved my learning outcomes.*

*I have a better understanding of the steps in managing post-partum haemorrhage and was able to apply theory and practical skills.*

*It is easy to remember things taught visually than from books.*

The findings suggested that students felt that they had gained knowledge because they had achieved their learning outcomes. The learning outcomes of the simulation session were specifically designed to allow students the opportunity to identify, diagnose and manage a patient with post-partum haemorrhage, using high fidelity simulation. This implied that students who attended the session were aware of their learning objectives. They learned the management steps prior to attending the session and applied their knowledge to manage the simulation scenario, following the appropriate steps in patient care. This created the sense

that students in the undergraduate programme and at the 4<sup>th</sup> year level were mature enough to take responsibility for their own learning.

There are many studies related to simulation that showed similar findings. Burns, O' Donnell and Artman (2010), identified 82% of their study respondents as having felt that they had acquired knowledge by participating in a simulation. Brannen, White, and Bezanson (2008) found that simulation education was superior in terms of knowledge acquisition, when compared with traditional lectures as the method of teaching. Other studies shared similar findings (Alinier, Hunt & Gordon, 2004; Bearnson & Wiker, 2005; Schoening, Settner & Todd, 2006; McCallum, 2006; Jeffries, 2007).

#### **4.3.2.2. Improvements in Clinical Skills**

One of the aims of using high fidelity simulation, is to prepare students with the clinical skills so that they feel competent and confident to use these skills in the clinical areas. Below are some of the comments that were received.

*I think it will be helpful. It will aid us in the clinical area as well. Just to know what is expected and how to conduct procedures in real life.*

*It is a good way of learning practical skills and will increase our confidence in being able to carry out the skills learned.*

The comments suggest that students understand that the profession of nursing, particularly midwifery in this case, demands the ability to use a multitude of practical skills. It seems that prior to this session, students felt less confident of being involved in procedures encountered in the clinical area. Learning, practicing and mastering certain nursing procedures, and using high fidelity simulation can empower student nurses to become more 'hands on' in the practical situation.

According to Prion (2008), the potential advantage of clinical simulation is to integrate clinical skills, content knowledge and a variety of other abilities in a real-life clinical situation. Findings from studies conducted by Linder and Pulsipher (2008); and Sundler, Petterson and Berglund

(2015) revealed that simulation has become an established pedagogy for teaching clinical skills, thus providing students the opportunity to gain essential skills in a 'real-life' like environment. Similar conclusions were evidenced by Hope et al. (2011); Comer (2005); Jeffries (2007) and Traynor et al. (2010), who advocated that simulation allowed students to improve clinical skills while applying their theoretical knowledge within a safe setting.

#### **4.3.2.3. Enhanced Learner Satisfaction**

In order for students to perform better, they need to be satisfied with their learning (Jeffries, 2007). From the analysis of the findings, it appeared that the students were satisfied with their involvement in the simulation session, and this was evident in some of their written quotes:

*It is most effective and should have been introduced earlier.*

*I recommend it a lot because visual learning reinforces learning, and we are able to remember what was done, like from scenes of a movie.*

The views suggested that the students were satisfied with using high fidelity simulation, had enjoyed working in a team and wished that such educational opportunities had been available earlier on in their programme. They related well in a team and the team leader displayed good delegation and communication skills. Within the clinical management process, the team members were all actively involved in managing the patient. They shared tasks and were all making suggestions to the team leader as well. The students appeared comfortable with each other throughout the session and this was probably because they belonged to the same student group (4<sup>th</sup> year nursing students) and had known each other for a number of years.

Many researchers have been concerned about learner satisfaction, because if students were satisfied with their learning, then their performance would be higher (Jeffries, 2007). Findings related to student satisfaction outcomes using high fidelity simulation were also noted in the following studies by Blum et al. (2010); Alfes, (2011); Mould et al. (2011); Khailala (2011). These studies showed that student nurses experienced higher satisfaction levels when learning using high fidelity simulations.



#### **4.3.2.4. Increased Self-Confidence**

The purpose of introducing the students to this type of innovative and realistic scenario was to help the students to gain knowledge and skills of a specific procedure, to practice using the equipment that was available and then to gain the confidence to use these skills in clinical practice. Section A of the student satisfaction survey confirmed that 98% of the students agreed that they were confident to use the knowledge gained from this simulation session in clinical practice. It was also evident in the scenario that students were professional in their behaviour and were confident in the manner in which tasks were completed. Some of the comments relating to self-confidence can be seen below.

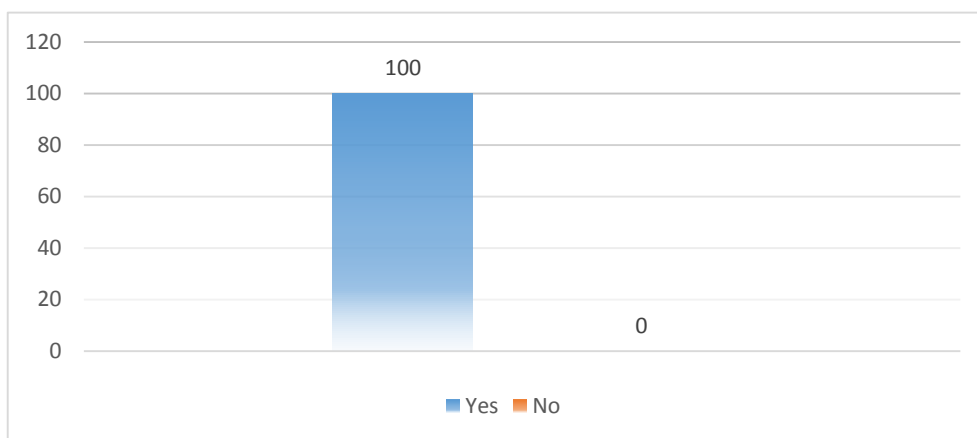
*It is a good way of learning practical skills and will increase our confidence in being able to carry out the skills in a practical situation.*

*I feel confident that now I can manage every bleeding that I come across.*

These findings support prior studies which showed increased self-confidence levels after learning by simulations, (Blum et al., 2010; Mould et al., 2011). In a study done by Khailala, (2013) to evaluate students' outcomes at their first clinical practice combined with simulations, the findings showed a rise in self-confidence after the students' first session.

#### **4.3.3. The Benefits of Using High Fidelity Simulation to Teach Undergraduate Students**

Question 2 of the student satisfaction survey, is two-fold. The question asks whether students in the undergraduate programme at the different levels will benefit from using high fidelity simulation, and then to substantiate the answer to the question. The results of the first part of the question revealed that 100% of the participants felt that high fidelity simulations should be introduced at the different levels of the undergraduate programme. Refer to Figure 4.6.



**Figure 4.6: Views Relating to the use of High Fidelity Simulation at the Different Levels of the Undergraduate Programme.**

The comments relating to the use of high fidelity simulation at the different levels of the undergraduate programme were condensed into meaning units, abstracted and labelled with a code. The various codes were compared based on differences and similarities, and sorted into four categories and seven sub-categories. The results were then placed in sub-categories, categories and themes. The results are presented in Tables 4.7.

**Table 4.7: The Benefits of Using High Fidelity Simulation**

Category	Provides an In-Depth Learning Experience				A Safe Learning Environment		Diverse Learning Styles	
Sub-categories	Gains knowledge and clinical skills.		Enhances critical thinking skills and self-confidence. Decreases anxiety levels.		Safe environment for errors. Time to practice.		Innovative teaching and feedback	
Codes	Improves knowledge and skills.	Correlates theory and Practical skills.	Promotes critical thinking.	Increases the student's confidence levels. Decreases the levels of anxiety.	Errors can be made and rectified.	Time to practice in order to master skills.	Innovative method of teaching.	Highlights gaps in knowledge.

The following are the categories that emerged from the codes regarding the benefits of teaching using High fidelity simulation:

**4.3.3.1. Provides an In-Depth Learning Experience**

A significant implication of any learning strategy is its ability to develop knowledge and understanding and in the case of nursing, to enhance practice. The feedback results showed that participants found that learning using simulation was an enjoyable and easier method of learning and they were able to grasp more by learning using interactive learning strategies. Some comments relating to their learning experience are highlighted below:

*They will be able to put themselves in real-life situations of emergencies that do take place in the clinical setting, they will be able to apply their theory into a practical situation- be proficient during emergencies.*

*Some people learn better from actually experiencing a problem like in this role-play.*

*Since Fidelity simulation is more practical, this will help undergraduates to obtain more knowledge because I believe that once you learn something and practice it, you will never forget it.*

*Starting of the simulation helps the students understand more before going to the real patient. It helps them with understanding the theory behind the practice.*

The preceding comments showed that participants felt that teaching using simulation was helpful in correlating theoretical knowledge with practical skills. They also infer that participants found that it was an easier method of learning, as they were actively involved in managing the patient and prioritising the patient's needs, just as it would be done in a real-life situation. These results further imply that students were able to apply the various skills which were needed in the role-play scenario. Such skills included critical thinking skills in an emergency situation, using good communication skills to get the expected co-operation and the efficacy of team members. Similar findings were produced in studies done by Bambini, Washburn and Perkins (2009) which showed increased self-efficacy and confidence among

student nurses as a result of simulation. Burns, O' Donnell and Artman (2010), revealed a significant gain in knowledge, critical thinking, confidence and communication. In similar studies done by Sundler et al. (2015) and Bland et al. (2011), students found the simulation experience to be meaningful, innovative and stimulated the students to learn.

#### **4.3.3.2. A Safe Learning Environment**

The results suggest that participants felt that using high fidelity simulation would help them to practice their skills before going to the clinical area. It also suggests that students felt that if they were involved in the simulation, it would mean that they would have time to practice their skills, and identify gaps or errors whilst mastering the procedure.

Some of the comments received were:

*It will clear misunderstandings and allow them to fix their mistakes.*

*They will be able to put themselves in real life situations of emergencies and be able to apply their theory into practice before experiencing it in the clinical area.*

*Since we do not get enough time in the clinical area, I think this will be very helpful in understanding what to do in real life settings.*

The findings showed two related cognitions. One is that the clinical skills laboratory is an ideal setting for students to practice their clinical skills in a safe learning environment and secondly, participants would prefer to use high fidelity simulators, which are available in the clinical skills laboratory, to practice their skills. The opportunity to practice skills before going into the clinical areas would help students to feel less anxious and more confident to use their skills when faced with similar real-life situations. Prior studies on simulation show that simulation-based training is an appropriate proactive approach to reducing errors and risks in obstetrics, as an opportunity to practice in a safe environment before clinical placement can be obtained (Birch et al., 2007; Jeffries, 2007; Bearson & Wiker, 2005).

#### **4.3.3.3. Visual Learning**

The results show that participants were sufficiently prepared before attending the simulation session. The support materials they received were adequate for them to manage a patient diagnosed with post-partum haemorrhage appropriately. The students were confident to be part of the role-play in the simulation session, which incorporated a diversity of learning styles. The majority of the participants were eager to play a role in the scenario, however, only 12 participants were needed. All participants expressed excitement when the video recording was played back as part of the feedback process. Students were joking around, giving broad smiles and praising their performance. Some of the comments included:

*It was easier to learn when you see something rather than learning from books.*

*Visual learning reinforced learning. We are able to remember what was done like from scenes of a movie.*

The results showed that high fidelity simulation afforded nursing students the opportunity to learn using creative and innovative methods of learning, such as visual learning. Viewing of the experience enabled students to evaluate their own performance and that of their peers, and by so doing encouraged reflective learning. In reflective learning, gaps in knowledge and skills can be identified and reinforced. The participants of this simulation experience were well prepared and therefore a sense of decreased anxiety and increased self-confidence was evident. Sundler et al., (2015) and Bland et al (2011) demonstrated that the use of visual feedback was important in improving the students' development of knowledge and skills even more.

The benefits related to using high fidelity simulation in the undergraduate programme were found in many previous studies. In an integrative review undertaken to analyse studies on the use of high-fidelity patient simulation (HFS) in undergraduate nursing education, it was found that the benefits of HFS among nursing students in terms of knowledge, value, realism, and learner satisfaction showed mixed findings. Nevin et al (2014) showed that the simulation experience was rewarding to both students and nurse educators as it allowed students to enjoy the process of developing critical thinking skills, integrating theory and practice, and

critically reflecting on their performance both individually and as a team, while working in a safe environment. Bland et al. (2011) states that the concept of simulation learning is a dynamic and its full potential as a learning strategy, deserves to be uncovered. The focus group sessions that followed aimed to uncover this potential and strengthen the true essence of using a mixed method of research.

#### 4.4. The Focus Group Session

A focus group session is a type of data collection process, which uses a semi-structured method to collect rich data within a short time span. Focus groups sessions aim to enhance discussion among participants, which is important to understand how focus groups can be used to generate different types of evidence. Focus groups have the potential to explore answers to 'how, why and what' questions (Munday, 2006).

Nonetheless, focus groups also have limitations. Groups are generally small and not necessarily representative of the population. (Nieuwenhuis, (2007), identifies three weaknesses concerning focus group interviews:

- (1) The impact of the group on the discussion,
- (2) The impact of the group on its participants, and
- (3) The role of the moderator.

The flow and outcomes of the focus group session can have a negative effect on the behaviour of the moderator. Nieuwenhuis, (2007) emphasises that the quality of the information obtained during the focus group interviews depends on the skill of the moderator. He further states that too much control in a focus group can lead to limited participation and expression of views by the participants, but too little control can cause participants to discuss irrelevant issues. According to Marshall and Rossman (2011), the analysis of the data is a time-consuming activity.

In this study, focus group sessions were used to explore the experiences of the students who participated in and /or observed a simulation session on post-partum haemorrhage. The

intention of using a focus group in this study was to explore two outcomes of the study which do not lend themselves easily to observational techniques. These outcomes are namely the critical thinking abilities and the self-confidence levels of students. Two focus group sessions were conducted, each by a facilitator (who was the researcher) and a research assistant who was a second year education student at a local university. The research assistant was available to write up field notes during the focus group session. The venue for the first focus group session was a classroom that was arranged with the chairs set-up in a circle, to aid discussion. Students were familiar with this arrangement of group discussions and were therefore comfortable in the focus group session. The first focus group session consisted of twelve participants between the ages of 22 and 30 years. These participants were the role-players of the two simulation sessions that were conducted. There were a total of four males and eight female participants. This allowed for an expression of the views of both male and female participants. The focus group commenced with the researcher welcoming and thanking the students for attending, and an introduction to the research topic was given. Ground rules were established and participants were asked if the discussion could be audio-taped. All participants agreed. The participants were reminded that participation was voluntary. The focus group was conducted in the English language and the researcher used the following discussion guide to direct the conversation. Probing questions were asked where the responses were not clear or were incomplete.

The following questions were developed to guide the focus group session:

1. How would you describe your experience in the simulation scenario?
2. Do you feel that the simulation scenario was beneficial to you?
  - 2.1. If yes, what are some of the benefits that you identified?
  - 2.2. If no, how can we improve the simulation scenario?
3. How do you feel about being able to manage a patient with post-partum haemorrhage following exposure to this type of learning?
4. Did the simulation scenario improve any skills?
  - 4.1. If yes, what skills were challenged in the scenario?

- 4.2. How did the participation in the simulation affect your self- confidence?
5. Would you like to be involved in other midwifery simulation learning sessions?

The first focus group session lasted approximately 35 minutes. At the end of the focus group session, all students were thanked for their participation.

During the analysis of the focus group session, it was evident that students were relaxed and communicated freely with the researcher. This could be related to the participants' familiarity with the researcher as their facilitator. Students were also comfortable with each other as they sat closely, nudging and smiling at times. They were highly satisfied with the outcomes, especially the way they acted during the scenario. They verbalised that they enjoyed the simulation session and viewed it as an innovative and exciting method of learning. There were no dominating group members noted, as most participants responded spontaneously to questions asked. The session thus appeared to be more like a question and answer session, with the researcher having a high level of involvement in the group. This was probably related to the fact that this was the first focus group session conducted by the researcher, and the first focus group session attended by this group of students.

During the analysis of the audio-recorded data, it was identified that some of the voices of the participants were inaudible. The session did not reach the saturation of the study, nor did it meet the satisfaction level of the researcher. Following this, a second focus group session was then planned to be conducted two weeks later.

The second focus group session was conducted at a local Hospital's Maternity Department, where student midwives are placed for clinical practice, two weeks after the simulation session on post-partum haemorrhage. Prior arrangements were made with the Operational Manager of the antenatal ward, in order to conduct the session. The purpose of the focus group session was explained to the Operational Manager, who agreed to release students for 30 minutes in order to attend the session. The researcher chose this particular ward because of its convenient central location for students, and it was therefore easier for students to attend and return timeously. On the day of the planned session, the researcher and the research



assistant arrived at the venue together, 20 minutes earlier than the scheduled 'start time', in order to meet with the Operational Manager. Both the researcher and the Operational Manager were happy to meet each other as they had worked together previously in the same department. The researcher introduced the research assistant to the Operational Manager and expressed thanks for the assistance provided. The Operational Manager accompanied the researcher and the research assistant to an organised room where the focus group session was to be conducted. The room was a well prepared private room which was similar to the setup of the first focus group session. The Operational Manager verbalised that the students had prepared the room that morning. Eight midwifery students were present on that day and were very excited to see their facilitator, (who was also the researcher) and the research assistant, whom they met on the day of the simulation session on PPH. There were seven female students and one male student who attended. All students consented to participate in the research and wanted to attend the focus group session. Of the eight students, one student was a role-player in the simulation session on post-partum haemorrhage. This role-playing student's inclusion in the focus group was viewed by the researcher as an opportunity to explore the clinical application following the simulation. The purpose of the second focus group session was to explore the views of the students who had observed the simulation session on post-partum haemorrhage. The researcher deliberately included the one role-playing in the group to promote a diversity of experiences on the topic and largely to enrich the findings. The results of both the focus group sessions are outlined below.

#### 4.4.1. The Results of the Focus Group Sessions

The results of the focus group sessions were analysed using qualitative content analysis. After identification of specific themes, open coding was used to analyse the data to find similarities and differences, (Graneheim & Lundman, 2004). By grouping similar actions and events, the researcher was able to create specific categories. The purpose of creating categories was to ensure that a complete description of the concept was clear. The intention was to interpret the meaning based on the individual study participant's perceptions and realities (Munhall, 2012). Qualitative research methods allow the researcher to describe and explore the experiences of the participants, with the intent to find a deeper meaning. It also helped the

researcher to uncover more details regarding the experiences of the simulation session and therefore augmented the data collected quantitatively. In this study, the experiences of both the role-players and the observers of the simulation on post-partum haemorrhage were explored in a focus group discussion. Based on the comments received from the participants in the focus group session, there were nine categories that emerged; and these categories will be discussed below.

#### **4.4.1.1. An Innovative Teaching Method**

The use of high fidelity simulation in the undergraduate programme is relatively new at this institution. The use of high fidelity simulation offers lecturers the opportunity to teach undergraduate students whilst simulating events from the practical area. Allowing students to practice using high fidelity simulation in case-based scenarios promotes high expectations among the students and among the facilitators. This is pertinent as it helps students to become competent in their skills and to accomplish their learning outcomes. In this study, the researcher used a case-based scenario to teach students how to manage PPH, incorporating the role-play as an active learning method. The findings revealed that the students found high fidelity simulation to be an innovative way of learning. One of the focus group participants said:

*I felt it was different from doing competencies that we have been doing in the past years.*

Another student agreed and commented:

*It is a new method of studying.... it seems effective. The management was done by students making it more interesting.*

Students felt that this new method of teaching made learning easier and more effective. One role-player commented:

*I applied my experience and it became easy...It was a nice experience for 4<sup>th</sup> years as we were not exposed to this type of teaching before.*

Another participant said:

*It is easier to learn when you see it rather than learn from the books. It will be great to experience this learning before going into a hospital setting.*

This was further emphasised by a third participant who said:

*The setup was very real. It was like being in a labour ward and therefore it was more practical.*

The results show that the simulation session was found to be an exciting and enjoyable interactive method of learning. Participants felt that was a different method of learning compared to the traditional competency testing method. Simulation helped them by reinforcing knowledge and preparing them for the clinical setting. They were able to apply theory with practice by participating in the simulation scenarios. This was the first scenario role-play that was conducted in the undergraduate programme using high fidelity simulators. Students found that using SimMom added realness to the scenario and they were able to link the simulation to the clinical situation. One participant said:

*SimMom responds like a real patient. Unlike other mannequins, you can speak to the SimMom and do [the] vital signs. You actually had to monitor the vital signs and not knowing what to expect added to the realness of the situation.*

Another student agreed and commented:

*My feelings towards simulation is that what the textbook tells you, you cannot see and you don't know how it looks but with simulation you can link it to the clinical situation.*

A third student added to this by saying:

*When you go to the clinical setting, it is the actual thing that is happening.*

According to McCallum, (2007) and Yaeger et al., (2004), where the simulation scenario is authentic, students will act as if the situation is real. The use of high levels of realism during the high fidelity simulation experiences, forces students to engage actively during a scenario

session, thus suspending disbelief and implementing interventions in an attempt to improve the condition of the simulated patient. According to Parker and Myrick (2009), nursing education has embraced technology-based learning as a tool designed not only to improve instruction but also to meet the learning needs of students. The 21<sup>st</sup> century students require tutoring based on increased participation in their own learning, with an increased realistic immersion. Through active participation, important nursing interventions can be highlighted, explained, illustrated and replayed.

The use of high fidelity simulation among nurse educators is relatively low and still perceived as new. In a study done by Dowie and Phillips (2011), the results indicated that although educators use simulation and are aware of its benefits, many lack confidence and feel insufficiently prepared to use it. Most lecturers felt that the development of a simulation module for lecturers would increase their confidence. The assumption is that nurse educators are reluctant to use high fidelity simulations due to their complexity. The findings of this study suggest that high fidelity simulation in the undergraduate programme allow educators an opportunity to use the framework of this learning package to develop new simulation learning packages that will provide a micro-world of real life situations. The intention is two-fold: Firstly to decrease the anxiety levels of educators, and secondly is to develop more simulation learning packages that will promote innovative learning.

#### **4.4.1.2. Promotes Teamwork**

An advantage of using high fidelity simulation includes opportunities for students to be the drivers of their own learning. The simulation scenario designed to manage post-partum haemorrhage demanded active learning through teamwork. The results of this study indicate that a high degree of teamwork existed among the participants. This was evident in the responses of the participants who found that the simulation promoted collaboration and that the management of post-partum haemorrhage demanded interdisciplinary teamwork.

One participant who was also a role-player in the scenario session commented:

*It was exciting to be part of the team in managing post-partum haemorrhage.*

*We did well working in a team. Everyone was involved.*

Another participant added:

*To run the actual scenario is not possible to do by yourself, you need help from others.*

The simulation scenario was designed to promote collaboration, active learning and high expectations. The views of the students complemented these three design characteristics, and this is evident in the following comments. One participant said:

*The simulation expected all role players to be involved and because the scenario was an emergency, you not just stood and looked, you had to be actively involved.*

A second student agreed and commented:

*It [the simulation session] highlights the importance of working in a team and the way in which a team should work.*

The researcher identified that during the simulation session, the team members appeared comfortable with each other and this was probably due to the fact that they were familiar with each other. There were no disagreements or unfriendly gestures or remarks noticed during the session. All members worked harmoniously in the team and this replicated the importance of team nursing that is usually practiced and promoted in the clinical settings.

Based on the findings, it was evident that the most important team member was the team leader, who was able to delegate tasks to the team members effectively. As part of the management, the team leader intermittently reassured the patient and the partner during the course of the procedure. Team members and observers felt that the team leader was central to the outcomes of both scenario sessions:

One student commented that:

*It was a smooth performance. Role-players did well. The team leader was able to do what was expected.*

Another student added:

*I found the team leader was very good. The way she was delegating was very effective and way she was giving orders...*

Simulation scenarios enhance communication with the patient, the relative as well as the interdisciplinary team members. Skills and procedures are practiced in an authentic situation and students become aware of the effect of their actions on patients, (Hughes and Quinn, 2013). In nursing, and more especially in midwifery because of the complexity of the conditions and the additional responsibility to the unborn child, achieving the desired patient outcomes rests on teamwork and effective communication. Effective teamwork in simulation scenarios may contribute to improvements in the quality of patient care, according to Elliot, et al. (2014).

Through simulation, student nurses are able to improve their teamwork skills and practise collective nursing actions (Wallin, et al., 2007). The participants of this current study felt that the interaction within the teams added to the reality of the situation and allowed them to practise their team nursing, as was also evident in other studies such as by Weller, (2004) and Schoening et al., (2006).

#### **4.4.1.3. Stimulates Critical Thinking Skills**

The scenario of post-partum haemorrhage is an obstetrical emergency and team members were therefore expected to work efficiently and effectively together. This demanded fast thinking and acting, which was evidenced in the team. The decisions made by the team were appropriate and according to correct pathway. The outcomes would have been detrimental to the patient, if the team had chosen either of the other two pathways. The results suggest that the participants were able to think critically when making decisions. The participants were, however, unaware that this skill was actually being demonstrated. Role-playing in an obstetric emergency scenario can be very challenging for students as the expectations of their performance are extremely high; but when students are placed in an emergency situation, they may “give of their best” and showcase a combination of skills (diversity in learning) in order to save the life of a patient.

One participant of the focus group said:

*At first it was a bit challenging. I applied my experience and it became easy. Simulation reinforced my knowledge.*

Other students also agreed and said:

*I think the involvement improved my critical thinking and decision making skills.*

One participant who role-played a nurse assistant in the scenario on PPH commented:

*I had to think quick on my feet. With SimMom you were able to check the patient's condition and vital signs and depending on your findings, you needed to think what to do next.*

This shows that the simulation session allowed for students to make their own decisions. These decisions depended on the interventions/actions or omissions of the students, which would have affected the pathways taken. At the post-simulation debriefing, students were able to watch the video recording of the simulation. During the focus group discussion at this debriefing, participants were able to analyse and provide feedback with regards to their own performance and that of the other role-players, as well as of the simulation itself. This once again promoted critical thinking, which was highlighted throughout the debriefing session and then emphasised further in the focus group session.

One participant during the focus group session said:

*When we were watching the video, we were able to pick up what went well or what went wrong and what was not done. And then we were able to evaluate ourselves and the team members as well.*

Another participant said:

*You could see [that] the students were doing a good job...*

The development of critical thinking is enhanced by exposing students to theoretical teaching and experiential learning (Huitt, 1998). Simulation allows for experiential learning to take place

by encouraging to students to use critical thinking skills to function at a higher cognitive level during simulation (Seropian *et.al* (2004) and Horan (2009). The incorporation of feedback opportunities in a debriefing session encourages student involvement and provides for a more intense value in the feedback as it is generated by their peers. Lasater (2007) attests that simulation provides students with a chance to develop clinical judgment and affords the faculty an opportunity to observe the students' clinical decision making and practice in a confined, prescribed setting. Besides promoting critical thinking skills, high-fidelity simulation fosters feelings of self-confidence and self-worth, as the students see themselves in action and come to the realisation that they can apply their knowledge, and make clinical judgements while under pressure to work effectively as a team to save a patient (Rourke, Schmidt & Garga, 2010; Mikasa, Cicero & Adamson, 2013).

#### **4.4.1.4. Improves Clinical Competence**

When given the opportunity to apply their knowledge and psychomotor skills to practice a task repeatedly in a safe and comfortable environment, students will become more competent in the procedure. The use of high fidelity simulation and the ability to see themselves in action, putting their learned theory into practice ignited the experiential learning cycle for the students. Some comments regarding clinical competence were captured when participants were asked how they felt about being able to successfully treat a patient with post-partum haemorrhage. One participant responded, saying:

*I was able to retain more information from the simulation scenario because I can recall what I saw them doing and will be able to link this to the clinical setting.*

*Another participant said:*

*I feel the simulation session boosted my competence as I was part of the team.*

*A third participant also agreed and said:*

*I feel competent as well after being exposed to this scenario because we have seen it and done it.*



The findings of this study show that this session helped participants to apply their knowledge and skills in a complex scenario on post-partum haemorrhage. They were able to successfully integrate knowledge, skills, multidisciplinary communication and critical thinking abilities into a clinical situation. Prion (2008) echoed this, stating that high fidelity simulation provided an instructional advantage as it gave the opportunity for students to put everything together realistically. Laschinger et al. (2008) went so far as to say that this mode of teaching sometimes lead to quicker acquisition of a skill than conventional training methods.

High fidelity simulation therefore allows students to apply their knowledge and a combination of skills in order to bring about increased levels of clinical competence.

One of the focus group participants said:

*I was impressed that with just a few lectures using simulation we can go into the clinical setting and know what is expected of us.*

Simulation scenarios enhance practice and may also reduce the time taken to achieve competence. Students learn faster using strategies that promote active learning. Laschinger et al. (2008) believe that simulation is an important addition to undergraduate nursing education, and can be used as an adjunct for clinical practice.

From the results of the focus group session that was conducted two weeks post-simulation experience, some students stated that they had had an opportunity to participate in a real life situation during their labour ward placement. The feedback showed that their real life experience was similar to the scenario. Students were directly involved in the management of the patient by recording vital signs, putting up intravenous fluids and inserting urinary catheters. They felt that the real life situation was much easier because they knew what to do and how to do it.

One participant said:

*The simulation helped me, because now I will go and assist and get involved in a situation. I wouldn't feel useless in that situation.*

Another participant agreed and commented:

*For me, when there are obstetric emergencies in the ward I usually panic and wait for someone to tell me what to do, so I do the very minimal. Now with PPH ... because we did the whole simulation thing, I know what to do more than I would for any other obstetric emergency.*

Murray et al. (2008), state that there is lack of clinical evidence to prove that the skills learned through simulation are actually transferred to the clinical setting. Contrary to these findings and those of Weaver (2011), the participants of this study showed quite clearly that they were able to transfer their skills learned during the simulation into the clinical setting. They felt competent because they were familiar with the setting and the scenario and were therefore able to apply their knowledge and skills into this particular practical situation. Based on the findings, it can be assumed that skills learned through simulation scenarios can be transferred to the clinical setting.

#### **4.4.1.5. Enhances Learner Satisfaction**

In this study, learner satisfaction was measured using a student satisfaction survey (Annexure 7). The results of the focus group reiterated the satisfaction of the participants, as evidenced by their comments. The results show that most participants were satisfied using simulation as a teaching method. They were able to see and participate in the training as if it was a real-life situation.

One participant said:

*I found that after the lecture I did not understand much, but after going through the simulation, I found that I understood much more.*

Another student said:

*I felt that simulation was very good because when you study the theory, you read and cram. But with simulation you can just remember what you did.*

These results of learner satisfaction are similar to the findings of a study done by Butler, Veltre and Brady (2009), which showed that groups who used high fidelity simulation gave a

significantly higher score in satisfaction in learning. The findings of this current study are also consistent with the findings of Jeffries and Rizzolo (2006), which revealed that students felt that their learning needs were satisfied with using HFS. They also stated that they realized the value of simulation as a learning strategy. They also wanted more exposure to high fidelity simulation especially with obstetrical emergencies and suggested that it should be also be included in the different levels of the undergraduate nursing programme. These findings are similar to several other authors in the field such as Baillie and Curzio (2009) and Mahoney, Hancock and Curly (2012).

#### **4.4.1.6. Identifies Gaps**

An important aspect in evaluation is to identify gaps or limitations. When errors or omissions are identified, improvement can be made to benefit the end users. From the focus group discussion, participants commented that they were able to identify gaps in their knowledge. The first step to learning is when participants are able to critically analyse their own learning needs.

One focus group participant commented:

*It was beneficial to me because I was able to identify gaps in learning. This was an eye opener as I was not exposed to this type of scenario before.*

Another student said:

*It helped me to know actually what I was doing and highlighted other areas that I needed to develop.*

Similar comments from another participant of the group suggested that, with simulation, they were able to see where they went wrong. One participant stated:

*Sometimes when something is happening, you miss a lot of things but when you watch what happened you can pick up what went wrong.*

These results imply that the use of debriefing/feedback opportunities in the designed simulation learning packages helped participants to identify gaps in their knowledge whilst at the same time allowed them to recognise needs that required further development. The

opportunity to learn from one's mistakes is a powerful teaching tool (Hoffmann, O' Donnell & Kim, 2007). It is important for students to recognise these deficiencies and bridge the gap between theory and practice, before actually going into the clinical environment. This will result in a decrease in errors or mistakes encountered in the clinical setting and thus improve the quality of nursing care whilst allowing students the freedom to develop their skills further (Bland et al., 2011; Valadares & Magro, 2014).

#### **4.4.1.7. Student Empowerment**

In this study, students were actively involved in the learning process within an appropriate environment. The tools and resources necessary for learning were also available. Comments regarding how learning had empowered students were evident in their responses during the focus group session. One participant said:

*The fact that we were shining, (smiling broadly) we were proud.*

Another participant added by saying:

*I feel that when we qualify, we don't need to shy away from emergencies.*

A third student commented:

*I think that if we go back to the clinical area, we should know how to do it.*

In this study, results show that after using the high fidelity simulation, students reported that they felt more confident and less anxious in patient-care situations. They felt that they were capable of managing a patient in a real life situation. Similar responses were also received from the observers of the simulation scenario.

One observer stated:

*The video was very empowering. Just to watch your colleagues perform so well, it is encouraging.*

Another student said:

*I was impressed with the role-players as they did not seem like 4<sup>th</sup> year students. You would think that it was really run by midwives.*

Empowerment seems likely to provide for an umbrella concept of professional development in nursing. According to Bradbury, Sambrook and Irvine (2007), the consequences of nursing student empowerment are high self-esteem, motivation for learning and positive regard for placement. Similar views were evident in a study done by Flood, et al (2011). Simulation works best when micro-worlds are created which are related to the learner's work place. The more realistic the environment, the more successful the learning will be (Wilford and Doyle, 2006). Therefore, students need to be highly prepared and empowered before entering real-life clinical patient settings.

#### **4.4.1.8. Integrates Psycho-Social Care**

Psychosocial care allows for the patients' psychological and social factors to be taken into consideration when assessing them. Psychosocial care is concerned with the psychological and emotional wellbeing of the patients and their families. The scenario on post-partum haemorrhage deliberately included the husband in the scene, in an attempt to identify how students would react to having a "non-staff member" in the labour ward. The rationale was also to incorporate the 'Mother and Baby Friendly Initiatives (WHO, 1991) and the Better Birth Initiative (2014), which promotes the importance of having a birth companion present to provide psychological support to mothers during labour. During the scenario, the team leader as well as the doctor reassured the patient and kept the relative informed about what was happening.

One participant who played the role of the husband said:

*As the husband, I felt like I was also part of the team. I was not neglected by the nurse and the doctor who reassured me.*

Another student agreed and said:

*I feel that having the relative actually made the scenario more realistic as the team leader was kind of forced to communicate with the SimMom as well as the relative, so I feel it was appropriate to have a relative included in the scene.*

Based on the belief that an understanding of psychosocial aspects of health care optimizes therapeutic outcomes, evidence suggests they are not reinforced or optimally implemented in clinical training, (Bambini, Washburn and Perkins, 2009). During simulation sessions, communication with the patient's family should be practised. The presence of the patient's family adds to the realness of the simulation experience and allows health care workers to practise communication skill with them (Tsai, et al., 2003) thus appreciating what family members can add to such a situation.

Although the majority of the students of this study felt that it was good to have the husband included in the scenario, there were a few who disagreed and therefore the role of the relative became a controversial matter. One participant said:

*For me, the husband should have waited outside, as this was an emergency. The staff could have called him in when they were done with the management.*

*Another student agreed and commented:*

*You also have to look at the situation holistically. Sometimes if the relative is present then you have to manage both.*

Both opinions were strongly emphasised and addressed, taking into consideration factors such as the context of the scenario. Both teams however, included the relative in their psycho-social management of the patient. This provided an important opportunity to debate these issues.

During simulation, communication with the patient's family should be practised. The presence of the patient's family adds to the realness of the simulated patient experience and allows health care workers to practise communication skills with them (Tsai, et al., 2003) thus appreciating what family members can add to a situation like this.

#### **4.4.1.9. Increases Self-Confidence**

Increased knowledge is the foundation required for the development of confidence and clinical skills allege Bearnson and Wiker (2005). Self-evaluation and feedback are important strategies that can be used to increase self-confidence. The findings of this study showed that an increase in self-confidence was achieved and this can be observed in the comments given by the participants.

One participant said:

*It boosted my confidence as I felt part of a team that managed the patient successfully.*

Another participant who played the role of the team leader said:

*It affected my self-confidence. As a team leader I felt we did well.*

Comments received from the observers were very similar to those comments received from participants. One student said:

*For me, in exams, I can just go back and recall the session and remember what to do.*

In a focus group session which was conducted two weeks after the simulation scenario on post-partum haemorrhage, one participant commented:

*After the simulation, we had a patient and I was really able to help because I knew what to do and this boosted my confidence.*

Another student agreed and said:

*It actually boosted our confidence in partaking in an emergency itself and when we qualify we won't need to shy away.*

The findings of this study support prior studies which showed increased self-confidence after learning using simulations (Blum et al., 2010; Mould et al., 2011; Baillie & Curzio, 2009). The self-confidence of students can be increased through high fidelity simulation. Lundberg (2008) explains that confidence-enhancing strategies include providing immediate feedback and allowing students to learn from peers and by practicing newly acquired skills. Rhodes and

Curran (2005) state that confidence is increased because students are allowed to practice their skill in a non-threatening environment, allowing for less anxiety and an increased focus on the task at hand.

Evaluating the effects of simulation experiences provide invaluable clinical experience for midwifery students as it allows them to overcome the lack of actual clinical involvement, (Lee & Kim, 2010). In a study done by Gordon and Buckley (2009), results showed that after using simulation, participants reported an increased confidence in their ability to perform both technical and non-technical aspects related to responding to a patient's clinical emergency after simulation. Simulation learning is not a stand-alone strategy as it complements clinical training and therefore should be integrated into the curriculum, with the purpose of improving current practices suggest McGaghie, et al., (2010).

The categories discussed above show that teaching using the developed simulation learning package on post-partum haemorrhage for undergraduate midwifery students was effective and beneficial. According to the data analysed, the package was rated to be of a high quality, effective and user-friendly. This is evident from the feedback received from experts in the field of nursing education and the end users, who are the midwifery students. The feedback from the student satisfaction survey shows that students were highly satisfied with using simulation to practice midwifery skills and felt that more simulation sessions should be included in the curriculum, especially for obstetric emergencies such as cord prolapse, breech deliveries, eclampsia, twin deliveries and shoulder dystocia. Students also reported that they valued the experience as it highlighted to them gaps in their knowledge, and enhanced their confidence for future clinical practice.

#### 4.5. Conclusion

It was evident from the results of the evaluation checklist for experts, the student satisfaction survey and the focus group sessions, that the educational practices and the design characteristics that were integrated into developing the SLP on post-partum haemorrhage for the undergraduate midwifery students appeared to be appropriate and useful to the students.



There are many benefits associated with the use of high fidelity simulation in nursing education, and the students in this study appeared to have experienced many of them.

Chapter 5 will focus on the summary of the results, the limitations, the recommendation and the conclusion of this study.

## CHAPTER 5: SUMMARY AND RECOMMENDATIONS

### 5.1. Summary of Results

This study focuses on the development, implementation and evaluation of a simulation learning package on post-partum haemorrhage using high fidelity simulation. The participants of this study were expert practitioners and educators, and undergraduate midwifery students at a university in KwaZulu-Natal.

A summary of the results will be discussed according the objectives of this study which are:

- Objective 1: To develop a simulation learning package on post-partum haemorrhage.
- Objective 2: To implement the simulation learning package.
- Objective 3: To evaluate the simulation learning package.

#### 5.1.1. Summary of Objective 1:

The researcher chose to develop a simulation learning package (SLP) using high fidelity simulation as an innovative method of teaching clinical competencies whilst simulating a real-life situation. Post-partum haemorrhage, which is a major preventable obstetric emergency, was selected because it is a complex condition which demands the incorporation of many clinical skills in order to manage a patient successfully. A literature search on how to develop a simulation learning package and on best practices for the treatment of post-partum haemorrhage was conducted using various databases, books, policies, guidelines and protocols. The searched literature and the best clinical practices were integrated to compile a simulation learning package (SLP) on post-partum haemorrhage for undergraduate midwifery students. Ten experts evaluated the package and found that the quality of the contents, the effectiveness of the package and the ease of use were suitable for undergraduate midwifery students. The aim of developing a SLP was to stimulate critical thinking, improve clinical competence and ensure student satisfaction. The Nursing Education Simulation Framework (Jeffries, 2007), was used to guide this study because it allows for the use of a combination of educational practices and simulation design characteristics that were found to be essential components of the framework. (Weaver, 2011; Nevin et al., 2014; Henderson, 2014; Hallmark, 2014; Adamson, 2015). The role of the teacher, the student and major educational practices

such as active learning, collaboration, diversity learning styles and the high expectations of the learners were considered when designing the simulation scenario found in the learning package. The researcher took into consideration the fact that students have different learning needs. The simulation scenario designed in this package aimed to stimulate the visual, auditory, tactile, or kinaesthetic senses of the learners and thus immerse students into a “real-life” situation, promoting meaningful learning (Jeffries, 2007). The researcher also ensured that high expectations for both facilitators and students were achieved by setting clear learning objectives related to the simulation experience and their module outcomes. Once the learning package was developed, it was put through a trial run, after which clinical experts who had attended gave suggestions on how to improve the authenticity of the scenario and overcome the logistical challenges.

The comments received from both the theoretical evaluation of the SLP (refer sub-section 4.1.6) as well as the simulation practice run, (refer sub-section 4.1.9) were used to make revisions to the package, thus making the developed Simulation Learning Package (SLP) suitable for undergraduate midwifery students.

#### 5.1.2. Summary of Objective 2:

There was a great deal of preparation that was required in order to run the simulation. A pre-simulation preparation and a briefing session preluded the simulation session on post-partum haemorrhage, in order to ensure that students were adequately prepared and would set high expectations for their learning experiences using the simulation. Two groups of students participated in the simulation session, to identify similarities and differences between the groups and to build on the diverse learning styles integrated in the scenario. From the observations of the scenario, both groups had performed extremely well in their roles. Observation showed that Group B appeared more confident and more efficient than Group A, and that although each group showed slight differences in their approach to nursing care, the principles of management were maintained and a holistic approach to patient care was provided. Immediate debriefing of the students (both of those who actively participated, as well as those observing) was done after the simulation scenarios were run. Students found the simulation experience to be innovative and novel as they had never experienced working

with high fidelity manikins before. They also stated that the simulation experience helped them to correlate theory and practice and enhanced their practical, critical thinking and decision making skills. This was because the situation felt “real” to them; they felt like they were in the clinical environment having to deal with this emergency situation - but at the same time knew it was a “safe” place where they could learn. Most observers of the simulation session found that the experience “grabbed their attention” as they were focused throughout the viewing of the session, thus making learning interesting. Students also stated that the simulation session made it obvious just how important team work was in managing this obstetric emergency. The students saw that the team leader played a very important role in the scenario, which affected the outcomes of the simulation experience. The participants in this study felt that the interaction within the teams added to the reality of the situation and allowed them to practice their team nursing.

There were no major setbacks identified by the researcher in the scenario session. Although the sound system which was not as clear as expected, needed minor adjustments to ensure that the observers were able to hear the comments from the students actively taking part in the scenario. During the debriefing session it became obvious that good sound quality was vitally important in the learning process of students.

Feedback from the facilitators (teachers) who assisted in the running of the scenario implied that the simulation session went well. They felt that the set up was realistic, “like a labour ward” and students appeared “professional” during their performance in the simulation session. They further stated that the simulation session was an excellent way to assess clinical competencies, as the simulation allowed for integrating a combination of clinical skills into one scenario session.

#### 5.1.3. Summary of Objective 3:

The evaluation of the simulation learning package on post-partum haemorrhage was carried throughout this study and it commenced from Phase 1 of the study when the package was evaluated by experts. This evaluation continued through Phase 2 when students and facilitators provided feedback on the scenario session on post-partum haemorrhage. In Phase

3, the simulation session on post-partum haemorrhage was evaluated by the results of the student satisfaction survey and the outcomes of the focus group sessions. The quantitative results of the student satisfaction survey showed that the pre-simulation support was adequate, well structured, and easy to follow and it included access to useful websites. As seen in this study and in previous studies by Hoffman, O'Donnell and Kim, (2007); Butler, Veltre and Brady (2009); Bland et al., (2011); and Magro and Valadares, (2014), the pre-simulation support is a vital aspect in preparing students for simulation and contributed greatly to student satisfaction.

Thirty percent (30%) of the participants felt that they needed more support before the simulation session. Due to the anonymity of the participants in this study, these findings could not be differentiated as to whether the comments made were by the role-players or the observers of the scenario session.

The post simulation outcomes showed that the simulation session on post-partum haemorrhage is a good way to evaluate the knowledge, clinical skills, decision-making skills, self-confidence and learner satisfaction. Scores of the post-simulation outcomes were much higher than the scores obtained for the pre-simulation support received.

The qualitative findings of the student satisfaction survey showed that high fidelity simulation provided students with an in-depth learning experience and afforded nursing students the opportunity to learn using creative and innovative methods of learning while practicing midwifery skills in a safe learning environment. The debriefing session that followed the simulation experience, allowed students to reflect on their experience and appeared to be a good medium for critical evaluations of self and peer performance. Through the debriefing session, students were able to identify gaps in their knowledge and skills and this awareness, contributed to their learning outcomes.

The focus group session revealed many benefits of using high fidelity simulation that complemented the findings of the student satisfaction survey. Similar findings included that the experience was authentic, stimulated critical thinking, improved clinical competence and enhanced learner satisfaction. In addition to these findings, students felt that the simulation

experience allowed them to integrate the psychosocial aspects of care, they were able to identify gaps in their knowledge, and they felt that the simulation session increased their self-confidence and therefore also empowered them for clinical practice. Therefore, high fidelity simulation within the undergraduate nursing curriculum has the potential to bridge the gap in clinical practice.

### 5.2. The Final refinement to the Simulation Learning Package

The results of the student satisfaction survey showed that a small percentage (30%) of students felt that the pre-simulation support was insufficient to participate in the scenario on post-partum haemorrhage. However, the participants of the focus group sessions commented that the pre-simulation support adequately prepared them for the scenario session. In an attempt to ensure that all students would be adequately prepared in future simulation sessions on PPH, the researcher added the following to the pre-requisite criteria:

- A minimum of 2 week of labour/ delivery clinical exposure.
- Watch a DVD on the management on Post-partum haemorrhage.
- Complete a clinical competency on Post-partum haemorrhage

It is important to note that implementing this SLP on post-partum haemorrhage using high fidelity simulation was time-consuming and therefore should be taken into consideration when planning simulation sessions. A good sound system was also vital when running the scenario session and most especially for the benefit of observers of the scenario. These logistical demands, if underestimated at the onset, can lead to unnecessary delays during the scenario run.

### 5.3. Amendments to the Nursing Education Simulation Framework

The Nursing Education Simulation Framework by Jeffries (2007) was chosen to guide this study. The NESF has five components which comprises of the teacher, student, educational practices, simulation design characteristics and the outcomes. Each component has sub-components and, the researcher considered and integrated each sub-component when designing the simulation scenario on post-partum haemorrhage. The role of the teacher is not only to teach but to facilitate and support learners throughout their learning experiences

(Jeffries, 2007). In the framework, although the teacher and student components are within their own entities showing ownership for teaching and learning respectively, they also overlap each other, showing that a reciprocal relationship exists between the role of the teacher and the role of the student. This simply implies that in order for learning to occur, the input received from both these components (teacher and students) is important to the overall success of learning. In this study, the role of the teacher as a facilitator of learning provides students with the ease to participate and enjoy the simulation experience whilst being aware that the teacher/ facilitator was available for support. A systematic review done by Hallmark, Thomas and Gantt (2014), suggests that for faculty-student interaction to have a positive influence on the learner, the faculty must be able to relate to the student's world of technology. Similar comments were seen in studies done by Gibson and Brown (2009) and Jeffries (2007).

According to Alinier (2010), the development of appropriate scenarios is critical in high fidelity simulation training in order to address specific learning objectives. The educational practices component of the simulation framework includes active learning, diverse learning styles, collaboration, high expectations and feedback. In this study, the researcher developed a complex simulation scenario on post-partum haemorrhage which incorporated many educational theories of learning such as Knowles's adult learning theory, Ausubel's meaningful theory, Kolb's experiential learning theories and Vygotsky's social cognitive learning.

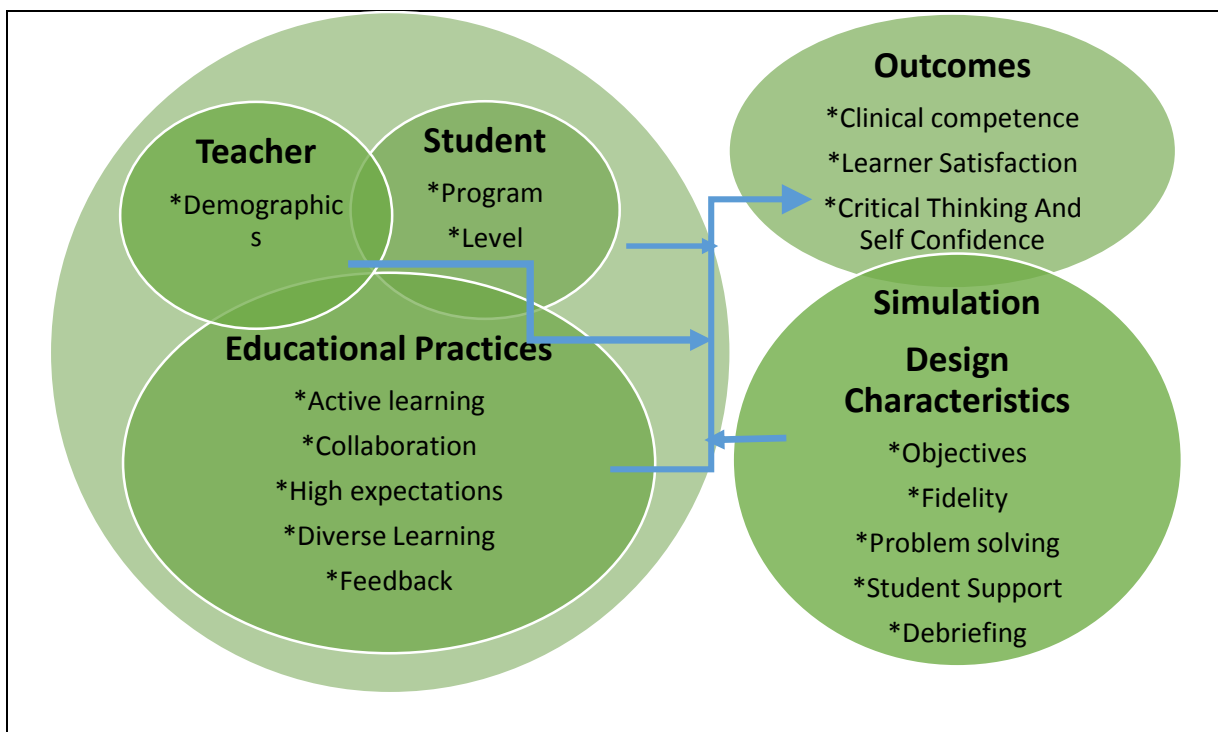
These theories of learning, explained in Chapter 4 of this study, promote the use of the educational practices defined in this framework. The teacher, the student, and the educational practices components overlap each other, indicating that an inter-relationship exists among each component. Similar findings showing this relationship were seen in studies done by Nevin, Neill and Mulkerrin (2014); Bergland and Sundler (2015).

According to Groom, Henderson and Sittner (2014), the simulation design characteristics serve as a fundamental guiding foundation for the creation, execution and evaluation of simulation scenarios. The five design characteristics of this framework are the learning objectives, the use

of fidelity, problem solving, student support, and reflective thinking (debriefing). The researcher has defined these features and linked them to the intended outcomes of the simulation session. The components of the design characteristic and the outcomes of this framework, showed a corresponding relationship. In this study, the researcher was continuously mindful of these design characteristic and how the variables influenced the outcomes.

According to Kirkpatrick, DeWitt- Weaver and Yeagar (2005), evaluating outcomes is essential to determine what students have learned, and the overall effectiveness of the simulation experience. La Fond and Van Vincent (2012) assert that additional rigorous research is necessary to further test relationships among concepts and the associated concept variables in the framework.

In addition to Jeffries' framework (Figure 2.1), the researcher has explored the components further, showing that a more influential relationship exists between the components and that each component is heavily reliant on the other when developing a SLP. This further inter-relationship can be explained in Figure 5.1 which is an amendment to the framework.





### **Figure 5.1: Amended Nursing Education Simulation Framework.**

#### **5.4. The Benefits of Using a Mixed Methodology in this Study**

The researcher chose a mixed methodology in this study, in an attempt to add richness and depth in understanding the concepts resulting from the study. A mixed method design expands the research such that the process of offering a statistical analysis, along with observation, makes the research more meaningful. In this study, the quantitative analysis from the evaluation checklist for experts (Annexure 6) and Section A of the student satisfaction survey (Annexure 7) looked for the selection of one answer as per a 5 point Likert scale, whilst the qualitative analysis focused on multiple answers that revealed findings that complemented the quantitative results. This was evident in the results of Section B of the student satisfaction survey, the debriefing session and the focus group session, where the researcher identified findings that were similar. In the process of finding a deeper understanding of concepts, the researcher identified the emergence of new themes which were used in this study to further intensify the discussion.

#### **5.5. Reflections of the Researcher**

This was the researcher's first attempt at designing a SLP using high fidelity simulation. It was found to be interesting and at times, a very challenging task. For this study, the researcher had to adapt from the role of being a teacher and facilitator of learning to that of being a researcher. During the actual design, collection, and analysis of data, it was difficult to operate in an exclusively teacher and / or researcher and facilitator role, and the study was therefore found to be challenging to the researcher. This method of integration was an eye-opener for the researcher who realised that her views of teaching was traditional. She was able to critically evaluate her own teaching strategies and expand the concepts of teaching from a traditional method to an innovative teaching method whilst being aware of the technological advances in nursing education and the demands of a new generation of students.

This study allowed the researcher an opportunity to become familiar with the functioning of high fidelity simulators and to work hand in hand with the technicians available in the clinical

skills laboratory. The technicians provided guidance in utilising the software package appropriately and supported the researcher's quest for designing a workable scenario on post-partum haemorrhage.

The researcher chose to develop a simulation learning package on post-partum haemorrhage, firstly because it is one of the most common and major preventable causes of maternal deaths, and secondly because the complexity of its clinical management process allows for the integration of a diversity of educational theories and learning strategies.

The research paradigm of this study was one of Pragmatism. Pragmatism is certainly not new to the social sciences and there are several good reviews of pragmatism, both as a general belief system for the social sciences and as a specific justification for combining qualitative and quantitative methods (Johnson and Onwuegbuzie, 2006). The researcher chose a pragmatic approach in order to understand the 'what' and 'how' of the research problem and therefore a mixed method design was used to enhance the findings of this study.

The demands of this study encouraged the researcher to adopt a new way of thinking about and analysing concepts, which was different from the researcher's personal paradigm of Positivism. The researcher, who assumed much of a quantitative deductive nature in personality (good with numbers, simple and goal defined) tried to find a more creative and descriptive side to her personality in an attempt to find a deeper understanding of herself in general. The researcher thus became fully immersed in the study in an attempt to sufficiently analyse the data. This adjustment was difficult for the researcher, however, time to reflect on and understand her personal paradigm and how it influenced her teaching and research abilities was undertaken. The researcher realised the personal potential to improve and vary teaching strategies by using innovative methods of teaching, and this change may have occurred without realisation when undertaking to develop a SLP.

Qualitative research is subjective and qualitative researchers realise that their values and perceptions influence findings. In order to reduce moderator bias in this study, the researcher tried to remain sensitive to the participants' verbal and non-verbal language. The researcher

audio-recorded the sessions and hired a research assistant to take field notes during the reflection sessions, in an effort to enhance objectivity in this study. Judgement was reserved until data analysis and theme identification had been concluded. To enhance the objectivity of the findings, the researcher made a deliberate attempt to set aside personal biases and ideas during the description and interpretation of data.

## 5.6. Recommendations

This study has highlighted a number of recommendations which are discussed below.

### 5.6.1. Recommendations for Nursing Education

The benefits of simulation have been recognised for over a decade, however, a fear of technology still exists among some faculty members and in order to overcome this problem, simulation should be incorporated into the curriculum at an earlier stage. Simulation learning complements clinical training and should be integrated into the curriculum with the purpose of improving/ augmenting current educational practices. It is however, recommended that simulation training sessions be held on an annual basis, so that staff become familiar with using high fidelity simulators and students have the opportunities to use them. Sufficient time needs to be set aside in order to develop such learning packages.

### 5.6.2. Recommendations for Nursing Practice

Obstetrics is a high risk environment and the safety of the mother and the unborn child is imperative. This safety demands the integration of a variety of nursing skills at any given time. Simulation provides an “authentic” safe environment for the practice of these essential skills before attending to patients in the “real” clinical setting.

### 5.6.3. Recommendations for Nursing Research

In this study, only the learning experience of the students were evaluated, further research on the perspectives of the educators is also required, as well as extending the research setting to include other nursing education facilities.

On-going research on the different methods of implementing high fidelity simulation is required at the different levels of nursing and as a rule, should be incorporated from the first year of training to enhance teaching and learning.

There is also a need for more research on realistic simulation approaches in order to support the enhanced use of simulation and more specifically to develop simulation packages that reflect emergency midwifery care.

Evaluating the impact of simulation-based training on actual patient outcomes is essential. The researcher believes that high fidelity simulation as a learning strategy has many possibilities for clinical nursing and the impact of simulation on placement performance should be further researched.

### 5.7. Limitation to the Study

A major limitation of this study can be related to the small sample size used and the single research setting chosen. However, a mixed research methodology was used in an attempt to strengthen the findings of this study.

This study required the evaluation of a draft simulation learning package on post-partum haemorrhage. A purposive sampling method was used to identify experts in the field of nursing education and midwifery/ obstetric care.

Some experts who were purposively identified to participate in the study declined involvement due to personal and work related reasons. The opinions of more experts in the field would have added to the value of the outcomes of this study.

### 5.8. Conclusion

The knowledge that the students appeared to obtain during the simulation scenarios is extremely valuable and although high fidelity simulation is a time consuming and work intensive practice, the benefits of using it appear to outweigh the limitations, according to the findings of this study.

The integration of high fidelity simulation into the undergraduate curriculum should be considered as it allows students an opportunity to experience a real life situation in a safe learning environment. This type of exposure should commence in their first year of the undergraduate programme, as it will offer students the opportunity to build from simple tasks

such as blood pressure monitoring in their first year to slightly more invasive skills such as the administration of intramuscular injections in their second year, to critical nursing care procedure such as resuscitation in their third year and finally, specialised midwifery care in their final year of training. Simulation enhances practice and may therefore reduce the time taken to achieve clinical competence. There are many studies that recommend using simulation to enhance classroom teaching and as a method that complements clinical accompaniment. More research is needed to show how simulation contributes to clinical expertise.

## 6. References

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## **7. Annexures**

### **Annexure 1: Information Sheet for Participants**

#### **Dear Student**

My name is Mrs Hafaza Bibi Amod. I am a student registered for a Masters in Nursing Programme at the University of KwaZulu-Natal. I am undertaking a study entitled, ***“Developing, implementing and evaluating a midwifery simulation package on post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.”***

You are kindly invited to consider participating in this study. The study aims to develop and evaluate a simulation package on post-partum haemorrhage for undergraduate midwifery students at the University of KwaZulu-Natal. Your participation in this study will also require your permission to be video-taped.

The study does not involve any risks. Please note that your identity and information will be treated with the utmost confidentiality. Please feel free to ask any questions you may have so that you are clear about what is expected of you.

#### **Please note the following:**

- You are free to participate in this research
- You are free to withdraw at any stage without repercussions
- Your name will not be used, nor will you be identified with any comment made when the data is published
- There will be no risks attached to your participation.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (Approval Number: HSS/0130/5M).

In the event of any problems or concerns/ questions you may contact the researcher/ research supervisor or the Research Committee as follows:

**The Researcher:** Mrs. Hafaza Bibi Amod, 5<sup>th</sup> floor Desmond Clarence Building, Howard Campus, Tel 031 260 3037 E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

**The Research Supervisor:** Professor Petra Brysiewicz, 5<sup>th</sup> floor Desmond Clarence Building, Howard Campus, Tel 031 260 3045 E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

**HSSREC RESEARCH OFFICE**

Full Name: Mr. Prem Mohun, HSS Research Office, Govan Bheki Building, Westville Campus  
Contact: 0312604557, Email: [mohunp@ukzn.ac.za](mailto:mohunp@ukzn.ac.za)

## Annexure 2: Informed Consent

I, (Participants Full Name/s), have been fully informed about the study entitled, **“Developing, implementing and evaluating a midwifery simulation package on post-partum haemorrhage for undergraduate midwifery students at a University in KwaZulu-Natal,”** which is being undertaken by Mrs Hafaza Bibi Amod.

I understand the purpose and the procedures of the study. I have read the attached information sheet and was given an opportunity to ask questions about the study to my satisfaction. I am aware that my participation will be video-recorded.

I declare that my participation in this study is entirely voluntary and that I may withdraw at any time without prejudice or it affecting my educational activities in any way. If I have any questions/ concerns related to the study, I understand that I may contact the researcher or research supervisor as follows:

**The Researcher:** Mrs. Hafaza Bibi Amod, 5<sup>th</sup> floor Desmond Clarence Building, Howard Campus, Tel 031 260 3037 E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

**The Research Supervisor:** Professor Petra Brysiewicz, 5<sup>th</sup> floor Desmond Clarence Building, Howard Campus, Tel 031 260 3045 E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact:

### **Humanities and Social Sciences Research Ethics Administration:**

Mr Prem Mohan, Research Office, Westville Campus, Govan Mbeki Building, Private Bag X54001, Durban, 4000, KwaZulu-Natal, SOUTH AFRICA.

Contact: 0312604557, Email: [mohunp@ukzn.ac.za](mailto:mohunp@ukzn.ac.za)

I hereby consent to:

1. Participation in a Simulation Scenario on post-partum haemorrhage
2. Completion of a survey and participation in a focus group discussion



3. Being video-recorded during my participation in the simulation scenario, debriefing session and focus group discussion.

Signature of Participant: \_\_\_\_\_ Date: \_\_\_\_\_

### Annexure 3: Letters

09 Road 710  
Montford  
Chatsworth  
4092  
04 November 2014

The Registrar  
School of Nursing and Public Health  
University of KwaZulu-Natal  
P.O Box 4041  
Durban

#### **RE: REQUESTING PERMISSION TO CONDUCT A RESEARCH STUDY AT THE UKZN- Howard Campus**

I, Mrs Hafaza Bibi Amod, am a student at the School of Nursing & Public Health who is currently registered for a Master's Degree in Nursing.

As a requirement for the degree, I am expected to conduct a research project. My topic is entitled, ***“Developing, implementing and evaluating a midwifery simulation package on Post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.”***

The study aims to develop, implement and evaluate a simulation package on post-partum haemorrhage for undergraduate midwifery students at the University of KwaZulu-Natal. I humbly request your permission to conduct this study in the above institution. The study involves the use of the venue, equipment and supplies at Clinical Skills Laboratory, George Campbell Building, Howard College Campus. A simulation scenario will be conducted for fourth year midwifery students registered in the B Nursing programme. The data collection process will commence once approval by the Human Social Sciences Research Ethics Committee is obtained.

Permission for voluntary participation will be requested from students who will participate in the study. Their rights related to confidentiality, informed consent, freedom of choice and anonymity will be observed. If they refuse to participate it will not affect their educational programme in anyway.

I trust my application will receive your favourable consideration and please let me know should you require any additional information.

**Yours sincerely**

Mrs Hafaza Bibi Amod

E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

Student number: 214 582 170

**Supervisor's Name:** Professor P. Brysiewicz

E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

09 Road 710  
Montford  
Chatsworth  
4092  
04 November 2014

The Dean  
School of Nursing and Public Health  
University of KwaZulu-Natal  
P.O Box 4041  
Durban

Dear Professor Ncama

**RE: REQUESTING PERMISSION TO CONDUCT A RESEARCH STUDY AT THE UKZN- Howard Campus**

I, Mrs Hafaza Bibi Amod, am a student at the School of Nursing who is currently registered for a Master's Degree in Nursing.

As a requirement for the degree, I am expected to conduct a research project. My topic is entitled, ***“Developing, implementing and evaluating a midwifery simulation package on Post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.”***

The study aims to develop, implement and evaluate a simulation package on post-partum haemorrhage for undergraduate midwifery students at the University of KwaZulu-Natal. I humbly request your permission to conduct this study in the above institution. The study involves the use of the venue, equipment and supplies at clinical skills laboratory. The simulation scenario will be conducted for fourth year midwifery students registered in the Baccalaureate of Nursing programme. Evaluation of the simulation package will be deduced from the feedback of students. The data collection process will commence once approval by the Human Social Sciences Research Ethics Committee is obtained.

Permission for voluntary participation will be requested from students who will participate in the implementation phase of the simulation package. Their rights related to confidentiality, informed consent, freedom of choice and anonymity will be observed. If they refuse to participate it will not affect their educational programme in anyway.

I trust my application will receive your favourable consideration and please let me know should you require any additional information.

**Yours sincerely**

Mrs Hafaza Bibi Amod      Student number: 214 582 170

E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

**Supervisor's Name:** Professor P. Brysiewicz

E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

09 Road 710  
Montford  
Chatsworth  
4092  
04 November 2014

The Academic Leader  
School of Nursing and Public Health  
University of KwaZulu-Natal  
P.O Box 4041  
Durban

Dear Professor Gugu Mchunu

**RE: REQUESTING PERMISSION TO CONDUCT A RESEARCH STUDY AT THE UKZN- Howard Campus**

I, Mrs Hafaza Bibi Amod, am a student at the School of Nursing who is currently registered for a Master's Degree in Nursing.

As a requirement for the degree, I am expected to conduct a research project. My topic is entitled, ***“Developing, implementing and evaluating a midwifery simulation package on Post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.”***

The study aims to develop, implement and evaluate a simulation package on post-partum haemorrhage for undergraduate midwifery students at the University of KwaZulu-Natal. I humbly request your permission to conduct this study in the above institution. The study involves the use of the venue, equipment and supplies at clinical skills laboratory. The simulation scenario will be conducted for fourth year midwifery students registered in the Baccalaureate of Nursing programme. Evaluation of the simulation package will be deduced from the feedback of students. The data collection process will commence in April 2015 once approval by the Human Social Sciences Research Ethics Committee is obtained.

Permission for voluntary participation will be requested from students who will participate in the implementation phase of the simulation package. Their rights related to confidentiality, informed consent, freedom of choice and anonymity will be observed.

I trust my application will receive your favourable consideration.

**Thanking you.**

Mrs Hafaza Bibi Amod

E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

Student number: 214 582 170

Supervisor's Name: Professor P. Brysiewicz

E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

Annexure 4: Letter to Experts

09 Road 710  
Montford  
Chatsworth  
4092  
04 August 2015

Dear Expert

**RE: REQUESTING YOU TO PARTICIPATE IN A RESEARCH STUDY**

I, Mrs Hafaza Bibi Amod, am a student at the School of Nursing and Public Health (University of KwaZulu-Natal). I am currently registered for a Master's Degree in Nursing.

As a requirement for the degree, I am expected to conduct a research project. My topic is entitled, ***“Developing, implementing and evaluating a midwifery simulation package on Post-partum haemorrhage for undergraduate midwifery students at a university in KwaZulu-Natal.”***

The study aims to develop, implement and evaluate a simulation learning package on post-partum haemorrhage for midwifery students. The study comprises of three phase. Phase 1 of the study is developing a simulation learning package on post-partum haemorrhage (Please see enclosed draft). This package will be reviewed by a minimum of 10 experts, from various universities and nursing colleges, for their recommendations and / comments. Once the package has been reviewed, Phase 2 of the study, which is the Implementation Phase will be conducted. Ethical permission to conduct my research study was obtained in May 2015. My protocol reference number is HSS/0320/015M.

You have been identified as an expert in the field of education and I humbly request your participation in evaluating the simulation learning package on post-partum haemorrhage.

**Your participation in this study is voluntary.**

I trust that my request will receive your favourable consideration.

**Thanking you.**

---

Mrs Hafaza Bibi Amod

E-mail: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

Student number: 214 582 170

Supervisor's Name: Professor P. Brysiewicz

E-mail: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

## Annexure 5: Declaration of Consent

### **DECLARATION OF CONSENT**

**PROJECT TITLE: “Developing, implementing and evaluating a simulation package on post-partum haemorrhage for undergraduate midwifery students at a University in KwaZulu-Natal.”**

#### **RESEARCHER**

Full Name: Hafaza Bibi Amod

School: School of Nursing and Public Health

College: Health Sciences

Campus: Howard

Proposed Qualification: Master’s Degree in Nursing

Contact details: 074 234 7394

Email: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

#### **SUPERVISOR**

Name of Supervisor: Professor Petra Brysiewicz

School: School of Nursing and Public Health

College: Health Sciences

Campus: Howard

Contact No: 031 260 1281

Email: [brysiewicz@ukzn.ac.za](mailto:brysiewicz@ukzn.ac.za)

#### **HSSREC RESEARCH OFFICE**

Full Name: Prem Mohun

HSS Research Office

Govan Bheki Building

Westville Campus

Contact: 0312604557

Email: [mohunp@ukzn.ac.za](mailto:mohunp@ukzn.ac.za)

I, Hafaza Bibi Amod, Student no. 214 582 170 am a Master’s in Nursing student, at the School of Nursing and Public Health at the University of KwaZulu-Natal. You are invited to participate as an expert in a research project entitled: ***Developing, implementing and evaluating a simulation package on post-partum haemorrhage for undergraduate midwifery students at a University in KwaZulu-Natal.***

Through your participation, I hope to evaluate the clinical competence, learner satisfaction, critical thinking and self- confidence outcomes of midwifery students using a simulation package on post-partum haemorrhage. I guarantee that your responses will not be identified with you personally. Your participation is voluntary and there is no penalty if you do not

participate in the study. Please sign on the dotted line to show that you have read and understood the contents of this letter. The questionnaire will take approximate 10 minutes to complete.

#### **DECLARARTION OF CONSENT**

I.....(Full Name) hereby confirm that I have read and understand the contents of this letter and the nature of the research project has been clearly defined prior to participating in this research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

Participants Signature:.....

Date: .....



## Annexure 6: The Evaluation Checklist for Experts

### **THE EVALUATION CHECKLIST FOR EXPERTS**

Thank you for participating in this study. Please see instructions below on completion of form.

Kindly refer to key below to rate the checklist:

**Key:** 1. Poor      2. Fair      3. Good      4. Excellent

<b>Quality of the content</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	Poor	Fair	Good	Excellent
Is the contents of the simulation package appropriate?				
Are the learning objectives clear?				
Is the content current?				
Is the content relevant for the level of the student?				
Is the content accurate?				
<b>Effectiveness of the tool</b>				
Does the simulation package include active learning practices?				
Does the simulation package allow for collaboration with peers and the facilitator?				
Does the simulation package use innovative/diverse learning styles?				

Does the objectives reflect high expectations of the learner?				
<b>Ease of use</b>				
Does the simulation package present information in an appealing way?				
Does the simulation package allow for feedback opportunities?				

**Additional Comments**

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**THANK YOU**

## Annexure 7: Student Satisfaction Survey

### **STUDENT SATISFACTION SURVEY**

Participants Code	
-------------------	--

All information herewith provided will be treated confidentially. It is not necessary to indicate your name in this questionnaire.

#### **INSTRUCTIONS:**

1. Please answer all questions as honestly, frankly and objectively as possible.
2. Please answer all close ended questions by providing an "X" in the box corresponding to the chosen alternative.

#### **SECTION A: SIMULATION TRAINING OVERVIEW**

**Instructions:** Tick the most appropriate column using the key as follows:

**Key: SA- Strongly Agree, A- agree, U-Unsure, D-Disagree, SD-Strongly Disagree**

<b>VIEWS RELATING TO THE SIMULATION TRAINING</b>	<b>SA</b>	<b>A</b>	<b>U</b>	<b>D</b>	<b>SD</b>
k. The support materials I received before attending the simulation session prepared me for the session					
l. The support materials I received were well structured					
m. The support materials I received were easy to follow					
n. The websites I accessed before I attended the simulation session were useful in preparing me for participating in the simulation session					
o. I needed more support with the preparation for this session					
p. The simulation process was helpful in understanding the core clinical skills in managing a critically ill patient in a safe environment					
q. The simulation scenario allowed me to test my knowledge to an appropriate level of nursing care for a critically ill patient					

r. The simulation scenario allowed me to demonstrate clinical decision-making skills					
s. I am confident that I will be able to use the knowledge gained from this simulation session in clinical practice					
t. The simulation session has aided my understanding and I feel I have achieved my learning outcomes					

Adapted from a study done by Nevin, Neill and Mulkerrins (2013).

### **SECTION B.**

How do you feel about using High fidelity simulation to test other competencies?

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Do you think that students in the undergraduate programme at the different levels will benefit from using high fidelity simulation? Substantiate your answer?

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**THANK YOU**

## Annexure 8: Guidelines for Debriefing Session.

### **Guidelines for Debriefing Session.**

#### **The debriefing session**

Post simulation scenario , a debriefing session will be conducted by the facilitator in a classroom. The classroom will be a circle setup of chairs with the facilitator choosing any seat next to a student. This is to facilitate a non-threatening environment for students to openly talk about their experience in the simulation scenario. Both the direct participants and the observers will join the debriefing session to explore their experiences of the simulation scenario.

Some question that can be addressed are:

1. How was your experience of participating in the simulation scenario?
2. How was your experience as an observer in the simulation scenario?
3. How do you feel about your performance?
4. How do you feel about the group performance?
5. What went well?
6. What could have been done differently?

The facilitator should also be available to respond to any comments and concerns. If there were concerns or unexpected events that did arise during the scenario, it should also be dealt with using a good judgement model approach. The debriefing session should last approximately 25-30 minutes.

## Annexure 9: Guidelines for the Focus Group Session

### **GUIDELINES FOR THE FOCUS GROUP SESSION**

#### Introduction of the Session:

- The facilitator will introduce herself and the co-facilitator.
- The need and reason for video- recording the focus group discussion will be explained.
- The agenda will be read out briefly.
- Each question will be carefully read to the group. Participants will be given a few minutes to carefully record his or her responses or answers. The discussion will then proceed around the answers to each question, one at a time.

#### Questions for focus group

3. How would you describe your experience in the simulation scenario?
4. Do you feel that the simulation scenario was beneficial to you?
  - 2.1. If yes, what are some of the benefits that you identified?
  - 2.2. If no, how can we improve the simulation scenario?
3. How do you feel about being able to manage a patient with post-partum haemorrhage following exposure to this type of learning?
4. Did the simulation scenario improve any skills?
  - 4.1. If yes, what skills were challenged in the scenario?
  - 4.2. Did the participation in the simulation affect your self- confidence? How
5. Would you like to be involved in other midwifery simulation learning sessions?

**THANK YOU**

# **A Simulation Package on Post-partum Haemorrhage for undergraduate Midwifery Students at a University in KwaZulu-Natal (Draft)**

Name: Mrs Hafaza Bibi Amod

Student Number: 214582170

Supervisor: Professor P. Brysiewicz

## **An introduction to the learning package**

This learning package is designed to encourage an innovative method of teaching student midwives by using high fidelity patient simulators in clinical laboratory settings. The learning package provides clear guidelines to both facilitators and students midwives on how to identify and manage women with signs of Post-partum haemorrhage following a normal vaginal delivery. The development of this simulation learning package is guided by the National Department of Health guidelines for the management of postpartum haemorrhage.

The use of simulation and more specifically, High Fidelity Simulators (HFS) within undergraduate nurse education is relatively new and has occurred due to a number of factors including growing fears and concerns relating to patient safety, making mistakes and patient litigation (Nevin, Neill, Mulkerrins, 2011). Multiple learning objectives can be taught in a realistic clinical environment during simulation without harming patients or learners.

Learners are able to reflect on their performances with a facilitator thus improving clinical competence and confidence before approaching patients (Wilford and Doyle, 2006).

Post-partum haemorrhage (PPH) is the most common and one of the most urgent emergencies in obstetric units. Globally obstetric haemorrhage remains a major cause of direct maternal death especially in poorly resourced settings, (*Pattinson et al, 2005*). In the developing world, several countries have maternal mortality rates in excess of 1000 women per 100,000 live births, and WHO statistics suggest that 25% of maternal deaths are due to PPH, accounting for more than 100,000 maternal deaths per year (*WHO, 2008*). The top 3 preventable causes of maternal deaths, accounted for almost 70% of maternal deaths:

- Non-pregnancy related infections (HIV&AIDS) (40.5%)
- Obstetric haemorrhage (14.1%)
- Hypertension (14 % ) (*Saving Mothers Report 2008-2010*)

Despite the decreasing levels of maternal mortality globally, statistics remain relatively unchanged in Southern African countries such as Botswana, Lesotho, Namibia, South Africa



and Swaziland. Failure to assess the clinical picture, underestimating blood loss, delayed treatment, lack of multidisciplinary team work and failure to seek timely senior help are some of the issues that were highlighted. Strategies to overcome these challenges include ensuring skilled attendance in emergency obstetric care, (Ameh, Msuya, Hofman, Raven and Mathai, 2012).

Daniels, Arafah, Clark, Waller, Druzin and Chueh, (2013) showed that simulation- trained teams had superior performance scores when tested in a labour and delivery drill and therefore concluded that simulation should be used to enhance obstetrical emergency training in resident education. The management of obstetric emergencies in the midwifery curriculum are currently taught using case-based scenarios. According to Badeau (2010), problem scenarios are designed to challenge the learners to meet the curriculum objectives. High fidelity simulation can be used to provide a more creative method of teaching. Laerdal is a leading provider of training, educational and therapy products for lifesaving and emergency medical care. The SimMom is a state of art birthing simulator with accurate anatomy and functioning. It is used to facilitate the training of birth management.

This simulation learning package on postpartum haemorrhage may therefore contribute significantly to Midwifery education and clinical practice. It is a safe way for students to practice their clinical skill with an “almost real” patient and thus ensures that remedial work and feedback can be given throughout the intervention.

## **A SIMULATION SCENARIO ON POST-PARTUM HAEMORRHAGE**

### **How to use this package?**

This package is an easy to use simulation learning package that can be useful to midwifery educators and clinical facilitators. It is specifically designed to teach Post-partum haemorrhage using high fidelity patient simulation (Laerdal SimMom). The programme uses the Laerdal Medical SimMom Instructor Application software which is linked to the Elo Software Touch System.

Laerdal Medical SimMom Application Software is easy to use and adaptable, allowing instructors to accommodate individual student or team learning needs at basic or advanced levels. The software also allows for the instructor to make changes during the scenario sessions and according to the pathways that the participating students undertake. These changes are viewed immediately by the students on the Elo Software Touch System which is a touch screen software package used.

This learning package is intended to evaluate the clinical competence of student midwives in managing post-partum haemorrhage. The postpartum haemorrhage scenario is designed for the students who have a pre-requisite knowledge of Postpartum Hemorrhage from the course materials provided and therefore requires actions that are based on the accepted steps in the management of postpartum hemorrhage.

This learning package on post-partum haemorrhage consists of the following:

1. The learning objectives
2. Pre-requisite knowledge for students
3. The pre-simulation preparation
4. The simulation design process
5. The roles of participants in the simulation session
6. The debriefing process

### 1. Learning objectives

- To identify the signs of postpartum haemorrhage using clinical findings.
- To prioritize haemorrhage as an obstetric emergency and act timeously.
- To manage postpartum haemorrhage according to the principles of management

### 2. The Pre-requisite knowledge for students

For this package, students are expected to have knowledge of:

1. The Physiology of the third stage of labour
2. The predisposing causes of Post-partum haemorrhage
3. The clinical features and diagnosis of post-partum haemorrhage
4. The immediate management of postpartum haemorrhage

### The following are suggested reading material:

1. Seller PM (2009) Midwifery, 2<sup>nd</sup> edition, 274-9
2. Saving Mothers. Essential steps in the Management of Common Conditions associated with Maternal Mortality. Dept. of Health. South Africa, 2007
3. Guidelines for Maternity Care in South Africa. Dept. of Health. South Africa, 2007
4. [www.hst.org.za/.../saving-mothers-2008-2010-fifth-report-confidential-e...](http://www.hst.org.za/.../saving-mothers-2008-2010-fifth-report-confidential-e...)
5. [www.uptodate.com/contents/overview-of-postpartum-hemorrhage](http://www.uptodate.com/contents/overview-of-postpartum-hemorrhage)

### 3. Pre-Simulation Preparation

<b>Room Set up</b>	<ul style="list-style-type: none"><li>• Labour/ Delivery room</li></ul>
<b>Simulator Props</b>	<ul style="list-style-type: none"><li>• Delivery Bed and Linen and a blanket</li><li>• Laerdal Computerised Simulation programme- Laerdal Medical SimMom Instructor Application Software linked with the Elo Software Touch System</li><li>• Laerdal SimMom dressed in hospital gown</li><li>• A boggy fundus (Laerdal Accessory item)</li><li>• Identity band on left wrist</li><li>• 1x 1litre Intravenous infusion of Modified Ringers Lactate on right arm</li></ul>

	<ul style="list-style-type: none"> <li>• 2X Bloody pads under patient and 500mls of artificial blood poured onto linen saver</li> <li>• A timer- clock</li> <li>• A chair for the birth companion</li> </ul>
<b>Equipment and surgical supplies placed on a trolley</b>	<ul style="list-style-type: none"> <li>• 1X Post-partum haemorrhage Sterile Pack which consist of 4X sponge holding forceps, 1X Needle holder, 1X small artery forcep, 1x mosquito forcep, 2 X medium retractors.</li> <li>• 2 x Intravenous giving set – 60 droppers</li> <li>• Jelco needles- different size 14 and 16</li> <li>• Cotton wool swabs</li> <li>• Tegaderm- medium size</li> <li>• Blood tubes-1x purple top, 1X black top and 2 yellow top tubes</li> <li>• Urinary catheter- size 14, 16</li> <li>• Urine drainage bag with a hanger</li> <li>• Elastoplast</li> <li>• 5ml/ 10ml syringe</li> <li>• Sterile water 5mls/10mls</li> <li>• Utility Pack- 1 X 10 Inch bowls, 1 X 1000ml receivers, 1X gallipot</li> <li>• Sanitary Pads</li> <li>• Adult Oxygen masks -40 % face mask and tubing</li> <li>• Oxygen cylinder- wall unit or portable</li> <li>• Suction apparatus and suction catheters- different sizes, 10, 12, 14</li> </ul>
<b>Medications and Blood Products placed in a Medication tray</b>	<ul style="list-style-type: none"> <li>• 4 Fresh Dried Plasma (FDP) IVI</li> <li>• 2X 1000mls Modified Ringers Lactate IVI</li> <li>• Oxytocin 30 units IVI</li> <li>• Misoprostol 600 mcg PR</li> </ul>

<p><b>Paperwork and supporting documents</b></p> <p>Post-delivery observation charts will be available for the students use (see attached). Initial observations done 30 minutes ago, will be plotted as indicated.</p>	<ol style="list-style-type: none"> <li>1. The storyboard with patient information.</li> <li>2. Blood pressure chart –BP 110/70, SFH 25cms and lochia –rubra moderate</li> <li>3. TPR chart- T- 37, P 84 R 20</li> <li>4. Fluid balance chart- 1litre MRL</li> <li>5. Medication chart- empty</li> </ol>
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#### 4. The simulation design process

##### Pre-session activity

1. Students should have read the pre-requisite knowledge.
2. Students should be familiar with the surroundings (Skill laboratory) and comfortable with using the birthing simulator (SimMom).
3. Students should know the principles of management for post-partum haemorrhage following a normal vaginal delivery.
4. All student will attend the session dressed in their proper uniforms with identification badges.
5. The facilitator involved in the scenario as the unit manager will be dress as a registered nurse.

### Simulation Scenario Development

**Scenario Name:** Post-partum haemorrhage

**Date submitted:**

**Submitted by:** Mrs Hafaza Bibi Amod

**Institution:** UKZN-Howard Campus

**Target Audience:** Student Midwives

**Goal:** To assess the clinical competence of student midwives in managing post-partum haemorrhage.

## **The storyboard**

***Mrs P, is a 34 year old patient. She delivered a healthy 4kg male infant an hour ago. The baby is transferred to the nursery. Her husband is present with her in the delivery room.***

### **Additional Information**

***Social History:*** Married. Husband at bedside.

***Past Medical History:*** Nil

***Allergies:*** Nil Known

***Surgical History:*** Nil

***Medications:*** Nil

***Obstetric History:*** Gravida 5 Para 5. All previous deliveries were NVD with no complications noted.

### ***Blood investigations:***

- *Rhesus- Positive*
- *RPR- negative*
- *HIV Status –negative*

### **Operator Instructions for the Technician**

1. Computer Set-up = Laerdal Medical SimMom Instructor Application Software programme linked to the Elo Software Touch Sytem.
2. Mannequin Set up

### **Observations at start:**

- Heart rate 115 beats per minute
- Respiratory rate 26 breaths per minute
- Blood Pressure 90/50
- Per vaginal blood loss of 1000mls

### **Trigger after 3 minutes**

Increase the heart rate to 120 beats per minute

Increase Respiratory rate to 30

Decrease the BP to 80/50

Increase Blood loss by a further 500mls

**Trigger after 6 minutes if appropriate actions are taken**

Decrease the heart rate to 90bpm

Decrease respirations to 22

Increase BP to 110/60

**Trigger after 6 minutes if unexpected or inadequate actions are taken**

Decrease the heart rate to 100bpm

Decrease respirations to 26

Increase BP to 90/60

Further 500mls of Blood loss

**Trigger after 6 minutes if No action is taken**

Decrease the heart rate to 0

Decrease Respiratory rate to 0

No Blood pressure reading

Increase Blood loss by a further 1000mls

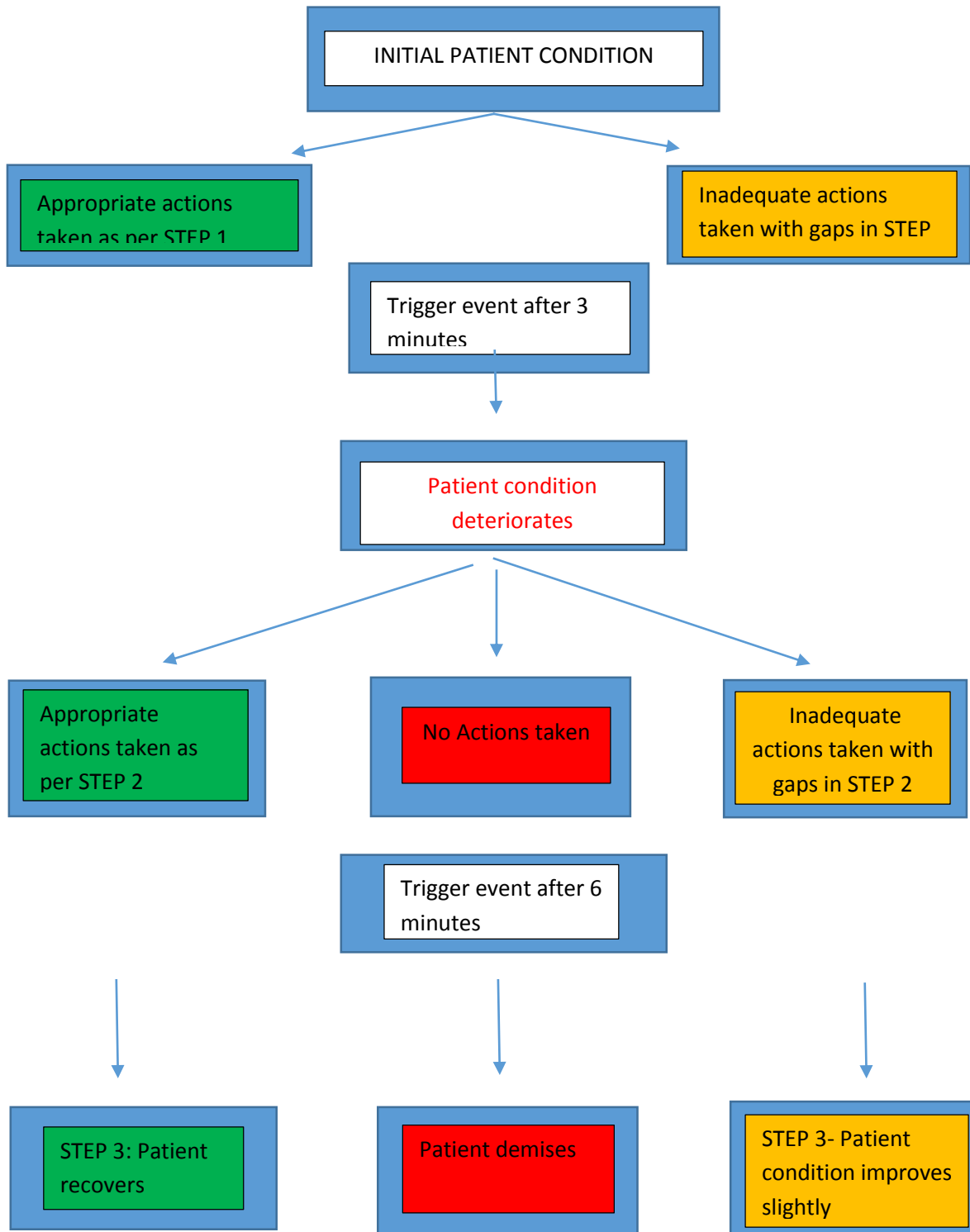
**Duration of Simulation**

Approximately 8-10 minutes

**General setting**

1. Patient simulator to groan every 2 minutes throughout the session
2. Monitors to bleep when vital signs are below the normal ranges

**Expected Outcomes of the proposed scenario on post-partum haemorrhage**



**KEY:** Green (Correct)

Red (incorrect)

Amber (incomplete)



**Scenario specific guidelines for managing post-partum haemorrhage.**

<b>Expected and Appropriate Actions</b>	
<b>Step 1</b>	
1. Assesses blood loss of >1000mls as excessive and diagnose as Postpartum haemorrhage	
2. Calls for help	
3. Reassures the patient and partner	
4. Rubs up the fundus to expel clots- uterus appears boggy	
5. Administer Oxygen @ 4-6 Liters via 40% face mask	
6. Checks Vital Signs –BP, pulse rate, respiratory rate	
7. Administer Pitocin 30 Units in 1 Litre MRL	
8. Insert an Indwelling Foley Catheter size 12-16 guage to empty the bladder	
9. Record Initial Amount of Urine on intake and output chart	
If the students does atleast 7 of the above 9, consider as appropriate care and proceed to the next step.	
<b>Trigger after 3 minutes-</b>	
<b>- Step 2</b>	
1. Identifies deterioration of condition	
1. Identifies changes in vital signs and further loss of blood	
2. Checks level of consciousness	
3. Start Second Line Intravenous fluid and take blood specimens (FBC, U&E, INR, Crossmatch)	
4. Rubs up the fundus -	
5. Does A Per Vaginal Exam- check for any retained products or any tears	
6. Inserts Misoprostal 600 Mcg Per Rectum	
7. Considers administering FDP infusion as per protocol	
If the students does at least 6 of the above 8, consider as appropriate care and proceed to the next step.	

<b>Trigger after 6 minutes-</b>
<b>STEP 3</b>
Reassess patient's condition –patient's condition improves due to the appropriate management that was rendered
Record all interventions in patient's nursing care plan

<b>Unexpected or Inadequate Actions</b>
<b>Step 1</b>
1. Assesses blood loss of > 500mls and makes a diagnose of Post-partum haemorrhage
2. Calls for help
3. Reassures the patient and partner
4. Rubs up the fundus to expel clots- uterus appears boggy
5. Administer Oxygen @ 4-6 Liters via 40% face mask
6. Checks Vital Signs –BP, pulse rate, respiratory rate
7. Insert an Indwelling Foley Catheter size 12-16 guage to empty the bladder
8. Administer Pitocin 30 Units in 1 Litre MRL
9. Record Initial Amount of Urine on intake and output chart
If the Student does not do any 6 of the above 9 steps, consider as inadequate and proceed to the next step.
<b>Trigger after 3 minutes-</b>
<b>- Step 2</b>
1. Identifies deterioration of condition
2. Identifies changes in vital signs and further loss of blood
3. Checks level of consciousness
4. Start Second Line Intravenous fluid and take blood specimens (FBC, U&E, INR, Crossmatch)
5. Rubs up the fundus -
6. Does A Per Vaginal Exam- check for any retained products or any tears

7. Inserts Misoprostal 600 Mcg Per Rectum
8. Considers administering FDP infusion as per protocol
If the Student does not do any 5 of the above 8 steps, consider as inadequate and proceed to the next step.
<b>Trigger after 6 minutes-</b>
<b>STEP 3</b>
Reassess patient's condition, slight improvement in condition noted, however, consider as incomplete management
Record all interventions in patient's nursing care plan

<b>No Actions Taken</b>
<b>Step 1</b>
1. Assesses blood loss of > 500mls and makes a diagnose of Post-partum haemorrhage
2. Calls for help
3. Reassures the patient and partner
4. Rubs up the fundus to expel clots- uterus appears boggy
5. Administer Oxygen @ 4-6 Liters via 40% face mask
6. Checks Vital Signs –BP, pulse rate, respiratory rate
7. Insert an Indwelling Foley Catheter size 12-16 guage to empty the bladder
8. Administer Pitocin 30 Units in 1 Litre MRL
9. Record Initial Amount of Urine on intake and output chart
If the Student does not do any of the above 9 steps, consider as incorrect management and proceed to next step
<b>Trigger after 3 minutes-</b>
<b>- Step 2</b>
1. Identifies deterioration of condition
10. Identifies changes in vital signs and further loss of blood

11. Checks level of consciousness
12. Start Second Line Intravenous fluid and take blood specimens (FBC, U&E, INR, Crossmatch)
13. Rubs up the fundus -
14. Does A Per Vaginal Exam- check for any retained products or any tears
15. Inserts Misoprostal 600 Mcg Per Rectum
16. Considers administering FDP infusion as per protocol
If the Student does not do any of the above 8 steps, consider as inadequate and proceed to the next step.
<b>Trigger after 6 minutes-</b>
<b>STEP 3</b>
The patient demises due to no interventions taken.
Record in patient's nursing care plan

##### 5. The roles of participants in the simulation session

Participants	Number	Roles
3X facilitators	1	Care-taker of students observing the scenario session
	2	Unit manager
	3	To program and control the simulation scenario with a technician
4X Students	1	Team leader
	2	Husband
	3	Junior student midwife
	4	Junior student midwife

2X Technician	1	Technical support for the simulator
	1	Technical support for the video recording and projection

## **Context**

### **Briefing**

Students will be given the storyboard and instructed to manage the patient (Mrs P) using the information and documentation provided.

### **Instructions to all participants:**

- 1. Read the Storyboard and manage Mrs P as per your role descriptions.**
- 2. Read your role description carefully before the scenario run commences.**

## **SCRIPTING OF ROLES**

1. Roles will be typed on action cards which will be given to each participants describing their roles in the scenario session.
2. The action cards will be issued to participants 5 minutes before the scenario run commences.
3. If participants have any questions or concerns regarding their roles it will be addressed before the scenario run commences.

### **Facilitator 1 = You are expected to do the following:**

- Take care of students observing the scenario session
- Ensure that the scenario run is visually clear and audible to the observers
- Keep the group focused on the scenario run
- Highlight important actions or concerns- make notes that can be discussed in the debriefing session if necessary
- Get immediate technical support if problems should arise

### **Facilitator 2 = You are expected to do the following:**

- Play the role of a unit manager in the scenario run
- If student states call for a Doctor- say "he is busy in theatre."
- If the student queries the haemoglobin results, say "the haemoglobin is 8.8g%."
- If students need to use a certain equipment or surgical supply but cannot see it, direct them to where it is placed.

### **Facilitator 3 = You are expected to do the following:**

- To program and control the simulation scenario as planned
- To keep a timer and ensure that triggers occur timeously
- Be familiar with the expected and appropriate actions in STEPS 1-3
- Be familiar with the unexpected or inadequate actions in STEPS 1-3

- Observe the participants and be prepared for any unexpected events that can be discussed in the debriefing session if necessary

**Student 1 = You are expected to do:**

- Play the role of a senior student midwife who is a team leader
- Remain with the patient throughout the process
- Be familiar with the equipment and surgical supplies that are available
- You have two junior midwives to assist you

**Student 2 = You are expected to:**

- Play the role of the husband
- At the start of the scenario say, “Nurse, nurse my wife is not looking okay!” (with a worried look)
- Sit next to the patient throughout the process- appear anxious and concerned
- At 4 minutes into the scenario run say, “Oh my God, is she getting better! Where is the doctor?”
- Remain seated until the end of the process

**Student 3 & 4 = You are expected to:**

- Play the role of a junior student midwife
- Assist the team leader with the management of this patient
- Be familiar with the equipment and surgical supplies that are available

**Technician 1 = You are expected to:**

- Provide assistance in setting up the simulation programme software as per scenario expectations.
- Make trigger changes after 3 minute intervals according to expected outcomes algorithm.

**Technician 2 = You are expected to:**

- Be responsible for the set-up of the video recording equipment and the projection of the scenario run to observers in an adjacent room

## **6. The debriefing session**

Post simulation, a debriefing session should be conducted by the facilitator in a classroom. The classroom will be a circle setup of chairs with the facilitator choosing any seat next to a student. This is to facilitate a non-threatening environment for students to openly talk about their experience in the simulation scenario. Both the direct participants and the observers will join the debriefing session to explore their experiences of the simulation scenario.

Some question that can be addressed are:

7. How was your experience of participating in the simulation scenario?
8. How do you feel about your performance?
9. How do you feel about the group performance?
10. What went well?
11. What could have been done differently?
12. Do you have any recommendations or suggestions and what are they?

The facilitator should also be available to respond to any comments and concerns. If there were concerns or unexpected events that did arise during the scenario, it should also be dealt with using a good judgement model approach. The debriefing session should last approximately 25-30 minutes.

## **CONCLUSION**

This simulation learning package is designed for teaching of students midwives on how to manage post-partum haemorrhage which is a major avoidable cause of maternal deaths in South Africa, Africa and worldwide. Using this simulation learning package is an innovative method of teaching and learning as it involves the use of the “SimMom” which is high fidelity patient simulator programmed with the Laerdal Medical SimMom Instructor Software and the Elo Software Touch System. This learning package focuses exclusively on managing post-partum haemorrhage as an obstetric emergency. It can be used as the foundation for developing other simulation learning packages that will enhance basic and advanced best practices in clinical nursing and nursing education.

It is a new, creative, safe and technologically advanced method of teaching students in an almost real to life scenario setting.



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# **A Simulation Learning Package**

## **Post-partum Haemorrhage**

**Developed by: Mrs Hafaza Bibi Amod**

**Supervised by: Professor Petra Brysiewicz**

**Discipline of Nursing**

**School of Nursing and Public Health**

**College of Health Science**

## **AN INTRODUCTION TO THE LEARNING PACKAGE**

This learning package is designed to encourage an innovative method of teaching student midwives by using high fidelity patient simulators in clinical laboratory settings. The learning package provides clear guidelines to both facilitators and student midwives on how to identify and manage women with signs of Post-partum haemorrhage following a normal vaginal delivery. The development of this simulation learning package is guided by the National Department of Health guidelines entitled, “Saving Mothers- Essential Steps in the Management of Common Conditions Associated with Maternal Mortality,” ([www.doh.gov.za](http://www.doh.gov.za)).

The use of simulation and more specifically, High Fidelity Simulators (HFS) within undergraduate nurse education is relatively new and has occurred due to a number of factors including growing fears and concerns relating to patient safety, making mistakes and patient litigation (Nevin, Neill, Mulkerrins, 2011). Multiple learning objectives can be taught in a realistic clinical environment during simulation without harming patients or learners.

Learners are able to reflect on their performances with a facilitator thus improving clinical competence and confidence before approaching patients (Wilford and Doyle, 2006).

Post-partum haemorrhage (PPH) is the most common and one of the most urgent emergencies in obstetric units. Globally obstetric haemorrhage remains a major cause of direct maternal death especially in poorly resourced settings, (*Pattinson et al, 2005*).

In the developing world, several countries have maternal mortality rates in excess of 1000 women per 100,000 live births, and WHO statistics suggest that 25% of maternal deaths are due to PPH, accounting for more than 100,000 maternal deaths per year (*WHO, 2008*).

The top 3 preventable causes of maternal deaths, accounted for almost 70% of maternal deaths:

- Non-pregnancy related infections (HIV&AIDS) (40.5%)
- Obstetric haemorrhage (14.1%)
- Hypertension (14 % ) (*Saving Mothers Report 2008-2010*)

Despite the decreasing levels of maternal mortality globally, statistics remain relatively unchanged in Southern African countries such as Botswana, Lesotho, Namibia, South Africa

and Swaziland. Failure to assess the clinical picture, underestimating blood loss, delayed treatment, lack of multidisciplinary team work and failure to seek timely senior help are some of the issues that were highlighted. Strategies to overcome these challenges include ensuring skilled attendance in emergency obstetric care (Ameh, Msuya, Hofman, Raven and Mathai, 2012).

Daniels, Arafeh, Clark, Waller, Druzin and Chueh (2013) showed that simulation- trained teams had superior performance scores when tested in a labour and delivery drill and therefore concluded that simulation should be used to enhance obstetrical emergency training in resident education. The management of obstetric emergencies in the midwifery curriculum are currently taught using case-based scenarios. According to Badeau (2010), problem scenarios are designed to challenge the learners to meet the curriculum objectives. High fidelity simulation can be used to provide a more creative method of teaching. Laerdal is a leading provider of training, educational and therapy products for lifesaving and emergency medical care, ([www.laerdal.com](http://www.laerdal.com)). The SimMom is a state of art birthing simulator with accurate anatomy and functioning. It is used to facilitate the training of birth management.

This simulation learning package on postpartum haemorrhage may therefore contribute significantly to Midwifery education and clinical practice. It is a safe way for students to practice their clinical skill with an “almost real” patient and thus ensures that remedial work and feedback can be given throughout the intervention.

## **A SIMULATION SCENARIO ON POST-PARTUM HAEMORRHAGE**

### **How to use this package?**

This package is specifically designed to teach Post-partum haemorrhage using high fidelity patient simulation (Laerdal SimMom). The programme uses the Laerdal Medical SimMom Instructor Application software which is linked to the Elo Software Touch System.

The software allows for the instructor to make changes during the scenario sessions and according to the pathways that the participating students undertake. These changes are viewed by the students on the Elo Software Touch System which is a touch screen software package that is used.

This learning package is intended to evaluate the clinical competence of student midwives in managing post-partum haemorrhage. The postpartum haemorrhage scenario is designed for the students who have a pre-requisite knowledge of Postpartum Hemorrhage from the course materials provided and therefore requires actions that are based on the accepted steps in the management of postpartum hemorrhage.

This learning package on post-partum haemorrhage consists of the following:

1. The learning objectives
2. Pre-requisite knowledge for students
3. The pre-simulation preparation
4. The simulation design process
5. The roles of participants in the simulation session
6. The debriefing process

### **1. Learning objectives**

- To identify the clinical signs and symptoms of postpartum haemorrhage.
- To prioritize haemorrhage as an obstetric emergency and act timeously.
- To manage postpartum haemorrhage using best practice guidelines which includes the physical and psychosocial aspects of care.

## **2. The Pre-requisite knowledge for students**

For this package, students are expected to have knowledge of:

1. The Physiology of the third stage of labour
2. The predisposing causes of Post-partum haemorrhage
3. The clinical features and diagnosis of post-partum haemorrhage
4. The immediate management of postpartum haemorrhage

### **The following are suggested reading material:**

1. Seller PM (2009). Midwifery, 2<sup>nd</sup> Edition, Juta and Company, Cape Town, South Africa.
2. National Department of Health (2007). Saving Mothers- Essential steps in the Management of Common Conditions associated with Maternal Mortality. Republic of South Africa
3. National Department of Health (2007). Guidelines for Maternity Care in South Africa, Dept. of Health. South Africa
4. <http://www.saving-mothers-2008-2010-fifth-report.com>
5. <http://www.postpartum-hemorrhage.com>

### **The following criteria should be completed by students before participating in the scenario role-play:**

1. A minimum of 2 week of labour/ delivery clinical exposure.
2. Watch a DVD on the management on Post-partum haemorrhage.
3. Complete a clinical competency on Post-partum haemorrhage

### 3. Pre-Simulation Preparation

<b>Room Set up</b>	<ul style="list-style-type: none"> <li>• Labour/ Delivery room</li> </ul>
<b>Simulator Props</b>	<ul style="list-style-type: none"> <li>• Delivery Bed and Linen and a blanket</li> <li>• Laerdal Computerised Simulation programme- Laerdal Medical SimMom Instructor Application Software linked with the Elo Software Touch System</li> <li>• Laerdal SimMom dressed in hospital gown</li> <li>• A boggy fundus (Laerdal Accessory item)</li> <li>• Identity band with patient's name secured on left wrist</li> <li>• 1x 1litre Intravenous infusion of Modified Ringers Lactate on right arm</li> <li>• 2X Bloody pads under patient and 500mls of artificial blood poured onto linen saver</li> <li>• A timer- clock</li> <li>• A chair for the birth companion</li> <li>• Two moveable trollies- 1 for catheterization and 1 for the emergency equipment</li> <li>• A red bin for waste disposal</li> </ul>
<b>Equipment and surgical supplies placed on a trolley</b>	<ul style="list-style-type: none"> <li>• 1X Post-partum haemorrhage Sterile Pack which consist of 4X sponge holding forceps, 1X Needle holder, 1X small artery forcep, 1x mosquito forcep, 2 X medium retractors.</li> <li>• Cuscoes</li> <li>• 2 x Intravenous giving set – 60 droppers</li> <li>• Jelco needles- different size 14 and 16</li> <li>• Cotton wool swabs</li> <li>• Tegaderm- medium size</li> <li>• Blood tubes-1x purple top, 1X black top and 2 yellow top tubes</li> <li>• Urinary catheter- size 14, 16</li> <li>• Urine drainage bag with a hanger</li> <li>• Elastoplast</li> <li>• 5ml/ 10ml syringe</li> <li>• KY Jelly lubricant</li> <li>• Sterile water 5mls/10mls</li> <li>• Utility Pack- 1 X 10 Inch bowls, 1 X 1000ml receivers, 1X gallipot</li> <li>• Sanitary Pads</li> </ul>

	<ul style="list-style-type: none"> <li>• Adult Oxygen masks -40 % face mask and tubing</li> <li>• Oxygen cylinder- wall unit or portable</li> <li>• Suction apparatus and suction catheters- different sizes, 10, 12, 14</li> <li>• Disposable aprons</li> <li>• Sterile gloves</li> <li>• Transpore tape</li> <li>• Chromic absorbable suture material</li> </ul>
<b>Medications and Blood Products placed in a Medication tray</b>	<ul style="list-style-type: none"> <li>• 2X 1000mls Modified Ringers Lactate IVI</li> <li>• Oxytocin 20 units IVI</li> <li>• Misoprostol 600 mcg PR</li> <li>• 4 Fresh Dried Plasma (FDP) IVI</li> <li>• 1 unit packed blood cells</li> </ul>
<b>Paperwork and supporting documents</b>  Post-delivery observation charts will be available for the students use (see attached). Initial observations done 30 minutes ago, will be plotted as indicated.	<ol style="list-style-type: none"> <li>4. The storyboard with patient information.</li> <li>5. Blood pressure chart –BP 110/70, SFH 25cms and lochia –rubra moderate</li> <li>6. TPR chart- T- 37, P 84 R 20</li> <li>7. Fluid balance chart- 1litre MRL</li> <li>8. Medication chart- empty</li> </ol>

#### **4. The simulation design process**

##### **Pre-session activity**

1. Students should have read the pre-requisite knowledge.
2. Students should be familiar with the surroundings (Skill laboratory) and comfortable with using the birthing simulator (SimMom).
3. Students should know the principles of management for post-partum haemorrhage following a normal vaginal delivery.
4. All student will attend the session dressed in their proper uniforms with identification badges.
5. The facilitator involved in the scenario as the unit manager will be dress as a registered nurse.



## Simulation Scenario Development

**Scenario Name:** Post-partum haemorrhage

**Date submitted:**

**Submitted by:** Mrs Hafaza Bibi Amod

**Institution:** UKZN-Howard Campus

**Target Audience:** Student Midwives

**Goal:** To assess the clinical competence of student midwives in managing post-partum haemorrhage using best practice guidelines which includes the physical and psychosocial aspects of care.

### The storyboard

*Ms Sim Mom, is a 34 year old patient. She delivered a healthy 4kg male infant an hour ago. The baby was transferred to the nursery. The placenta was delivered complete and healthy. Her husband is present with her in the delivery room.*

#### Additional Information

**Social History:** Married. Husband at bedside.

**Past Medical History:** Nil

**Medications:** Nil

**Surgical History:** Nil

**Allergies:** Nil Known

**Obstetric History:** Gravida 5 Para 5. All previous deliveries were NVD with no complications noted.

#### **Blood investigations:**

- Rhesus- Positive      RPR- negative      HIV Status –negative

#### **Operator Instructions for the Technician**

3. Computer Set-up = Laerdal Medical SimMom Instructor Application Software programme linked to the Elo Software Touch Sytem.

4. Mannequin Set up

#### **Observations at start:**

- Heart rate 115 beats per minute
- Respiratory rate 26 breaths per minute
- Blood Pressure 90/50
- Active per vaginal blood loss of >1000mls

#### **Trigger after 3 minutes**

Increase the heart rate to 120 beats per minute

Increase Respiratory rate to 30

Decrease the BP to 80/50

Increase Blood loss by a further 500mls

**Trigger after 6 minutes if appropriate actions are taken**

Decrease the heart rate to 90bpm

Decrease respirations to 22

Increase BP to 110/60

**Trigger after 6 minutes if unexpected or inadequate actions are taken**

Increase the heart rate to 130bpm

Decrease respirations to 26

Decrease BP to 80/50

Further 500mls of Blood loss

**Trigger after 6 minutes if No action is taken**

Decrease the heart rate to 0

Decrease Respiratory rate to 0

No Blood pressure reading

Increase Blood loss by a further 1000mls

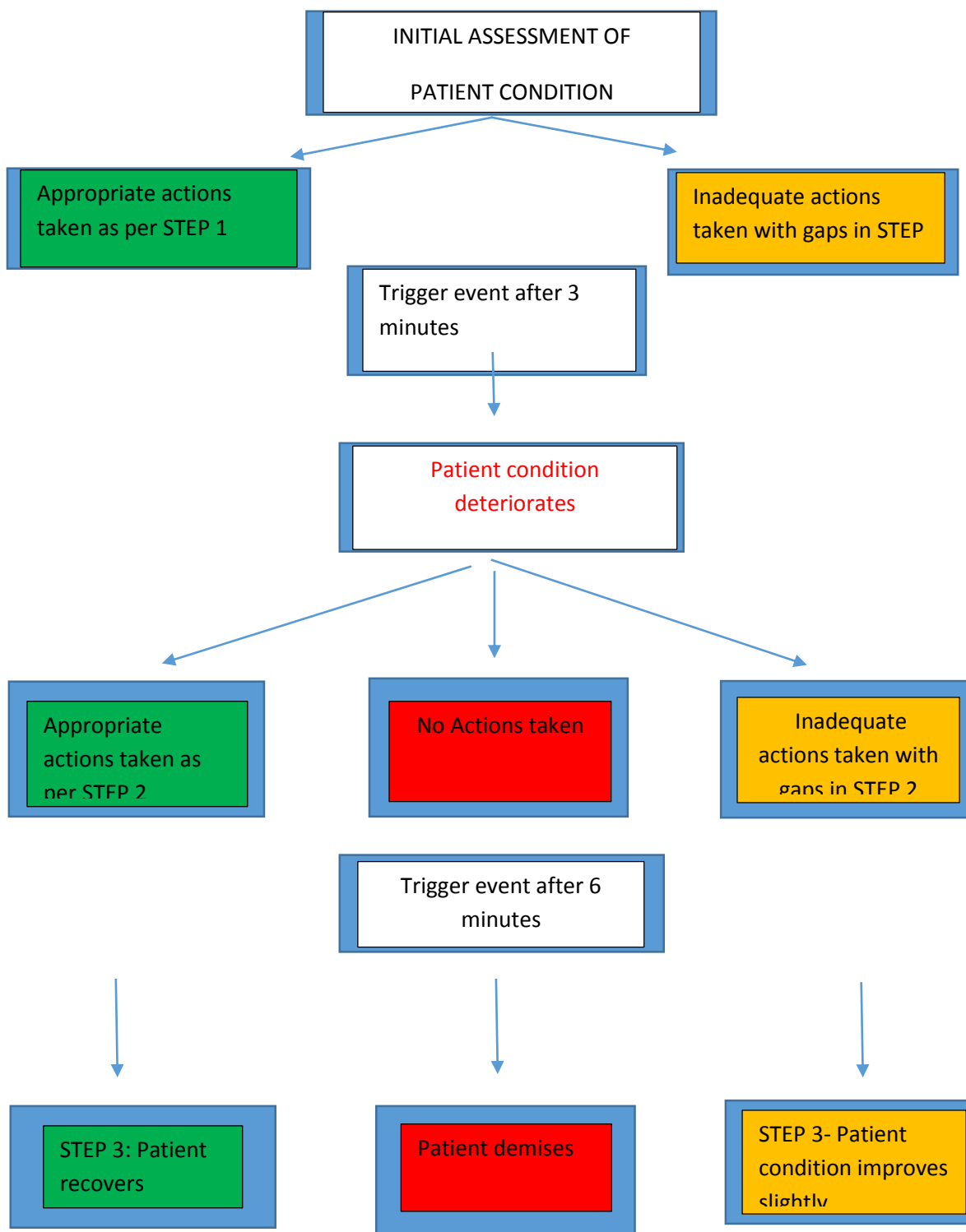
**Duration of Simulation**

Approximately 8-10 minutes

**General setting**

3. Patient simulator to groan every 2 minutes throughout the session
4. Monitors to bleep when vital signs are below the normal ranges

**Expected Outcomes of the proposed scenario on post-partum haemorrhage**



**KEY:** Green (Correct)

Red (incorrect)

Amber (incomplete)

**Scenario specific guidelines for managing post-partum haemorrhage.**

	<b>Expected and Appropriate Actions</b>
	<b>Step 1</b>
❖	10. Assesses blood loss of >1000mls as excessive and diagnose as Postpartum haemorrhage
	11. Calls for help
❖	12. Checks level of consciousness. Assesses circulation, Airways and Breathing (CAB).
	13. Reassures the patient and partner
❖	14. Rubs up the fundus to expel clots- uterus appears boggy, release and repeat
❖	15. Administers Oxygen @ 4-6 litres via 40% face mask
❖	16. Checks Vital Signs –BP, pulse rate, respiratory rate and Ward Hb
❖	17. Commences intravenous therapy X2 lines- one on each hand.
❖	18. Administers Pitocin 20 Units in 1 Litre MRL
❖	19. Inserts an Indwelling Foley Catheter size 12-16 guage to empty the bladder
	20. Records Initial Amount of Urine on intake and output chart
	Student is expected to do all 8 critical points and then proceed to the next step.
	<b>Trigger after 3 minutes-</b>
	<b>- Step 2-</b>
❖	1. Identifies deterioration of condition
❖	2. Identifies changes in vital signs and further loss of blood
	3. Takes blood specimens (FBC, U&E, INR, Crossmatch)
❖	4. Rubs up the fundus again
❖	5. Does A Per Vaginal Exam- check for any retained products or any tears
❖	6. Inserts Misoprostal 600 Mcg Per Rectum
❖	7. Considers administering FDP infusion as per protocol

	Student is expected to do all 6 critical points and then proceed to the next step.
	<b>Trigger after 6 minutes-</b>
	<b>STEP 3</b> Reassess patient's condition –patient's condition improves due to the appropriate management that was rendered
	Record all interventions in patient's nursing care plan

	<b>Unexpected or Inadequate Actions</b>
	<b>Step 1</b>
❖	10. Assesses blood loss of > 500mls and makes a diagnose of Post-partum haemorrhage
	11. Calls for help
	12. Reassures the patient and partner
❖	13. Rubs up the fundus to expel clots- uterus appears boggy
❖	14. Administer Oxygen @ 4-6 Liters via 40% face mask
❖	15. Checks Vital Signs –BP, pulse rate, respiratory rate
❖	16. Commences Intravenous therapy X 2 lines on each hand
❖	17. Insert an Indwelling Foley Catheter size 12-16 guage to empty the bladder
❖	18. Administer Pitocin 30 Units in 1 Litre MRL
	19. Record Initial Amount of Urine on intake and output chart
	If Student does at least 4 critical points, consider as inadequate however, proceed to the next step.
	<b>Trigger after 3 minutes-</b>
	<b>- Step 2</b>
❖	1. Identifies deterioration of condition
	9. Identifies changes in vital signs and further loss of blood

❖	10. Checks level of consciousness
	11. Take blood specimens (FBC, U&E, INR, Crossmatch)
❖	12. Rubs up the fundus again
❖	13. Does A Per Vaginal Exam- check for any retained products or any tears
❖	14. Inserts Misoprostal 600 Mcg Per Rectum
❖	15. Considers administering FDP infusion as per protocol
	If the Student does at least 4 critical points, consider as inadequate and proceed to the next step.
	<b>Trigger after 6 minutes-</b>
	<b>STEP 3</b>  Reassess patient's condition, slight improvement in condition noted, however, consider as incomplete management
	Record all interventions in patient's nursing care plan

	<b>No Actions Taken</b>
	<b>Step 1</b>  17. Assesses blood loss of > 500mls and makes a diagnose of Post-partum haemorrhage
❖	18. Calls for help
	19. Reassures the patient and partner
❖	20. Rubs up the fundus to expel clots- uterus appears boggy
❖	21. Administer Oxygen @ 4-6 Liters via 40% face mask
❖	22. Checks Vital Signs –BP, pulse rate, respiratory rate
❖	23. Insert an Indwelling Foley Catheter size 12-16 guage to empty the bladder
❖	24. Administer Pitocin 30 Units in 1 Litre MRL
	25. Record Initial Amount of Urine on intake and output chart

	If the Student omits 4 or more critical points, consider as incorrect management and proceed to next step.
	<b>Trigger after 3 minutes-</b>
	<b>- Step 2</b> 1. Identifies deterioration of condition
❖	2. Identifies changes in vital signs and further loss of blood
	5. Checks level of consciousness
	6. Start Second Line Intravenous fluid and take blood specimens (FBC, U&E, INR, Crossmatch)
❖	7. Rubs up the fundus -
❖	8. Does A Per Vaginal Exam- check for any retained products or any tears
❖	9. Inserts Misoprostal 600 Mcg Per Rectum
❖	10. Considers administering FDP infusion as per protocol
	If the Student omits 3 or more critical points, consider as incorrect management and proceed to next step.
	<b>Trigger after 6 minutes-</b>
	<b>STEP 3</b> The patient demises due to no interventions taken.
	Record in patient's nursing care plan

## **5. The roles of participants in the simulation session**

Participants	Number	Roles
2X facilitators	1	Unit manager
	2	To program and control the simulation scenario with a technician
	3	To remain with the observing participants (optional)

6X Students	1	Team leader
	2	Husband
	3	Junior student midwife
	4	Junior student midwife
	5	Medical officer
	6	Staff Nurse- Recordkeeping
1X Technician	1	Technical support for the simulator
	2	Assisting with Video recording (optional)

### **Context**

#### **Briefing**

Students will be given the storyboard and instructed to manage the patient (Ms Sim Mom) using the information and documentation provided.

#### **Instructions to all participants:**

- 3. Read the Storyboard and manage Ms Sim Mom as per your role descriptions.**
- 4. Read your role description carefully before the scenario run commences.**

### **SCRIPTING OF ROLES**

4. Roles will be typed on action cards which will be given to each participants describing their roles in the scenario session.
5. The action cards will be issued to participants 5 minutes before the scenario run commences.
6. If participants have any questions or concerns regarding their roles it will be addressed before the scenario run commences.

#### **Facilitator 1 = You are expected to do the following:**

- Take care of students observing the scenario session
- Ensure that the scenario run is visually clear and audible to the observers
- Keep the group focused on the scenario run
- Highlight important actions or concerns- make notes that can be discussed in the debriefing session if necessary
- Get immediate technical support if problems should arise



**Facilitator 2 = You are expected to do the following:**

- Play the role of a unit manager in the scenario run
- If student states call for a Doctor- say “he is busy in theatre.”
- If the student queries the haemoglobin results, say “the haemoglobin is 8.8g%.”
- If students need to use a certain equipment or surgical supply but cannot see it, direct them to where it is placed.

**Facilitator 3 = You are expected to do the following:**

- To program and control the simulation scenario as planned
- To keep a timer and ensure that triggers occur timeously
- Be familiar with the expected and appropriate actions in STEPS 1-3
- Be familiar with the unexpected or inadequate actions in STEPS 1-3
- Observe the participants and be prepared for any unexpected events that can be discussed in the debriefing session if necessary.

**Student 1 = You are expected to do:**

- Play the role of a senior student midwife who is a team leader
- Remain with the patient throughout the process
- Be familiar with the equipment and surgical supplies that are available
- You have two junior midwives to assist you

**Student 2 = You are expected to:**

- Play the role of the husband
- At the start of the scenario say, “Nurse, nurse my wife is not looking okay!” (with a worried look)
- Sit next to the patient throughout the process- appear anxious and concerned
- At 4 minutes into the scenario, stands up and say, “Oh my God, is she okay! Where is the doctor?”
- Remain seated until the end of the scene.

**Student 3 & 4 = You are expected to:**

- Play the role of a junior student midwife
- Assist the team leader with the management of this patient
- Be familiar with the equipment and surgical supplies that are available

**Student 5= You are expected to:**

- Play the role of a medical officer
- Walks into the scenario 7 minutes later

**Student 6 = You are expected to:**

- Play the role of a staff nurse who will record all the interventions undertaken in the scenario.
- She is to mention her task at the onset of the scenario, verbalize what she is recording as the role players verbalize what they are doing and end the scenario stating that all interventions have been recorded.

**Technician 1** = You are expected to:

- Provide assistance in setting up the simulation programme software as per scenario expectations.
- Make trigger changes after 3 minute intervals according to expected outcomes algorithm.

**Technician 2 (Optional)**= You are expected to:

- Be responsible for the set-up of the video recording equipment and the projection of the scenario run to observers in an adjacent room

## 6. **The debriefing session**

Post simulation, a debriefing session should be conducted by the facilitator in a classroom. The classroom will be a circle setup of chairs with the facilitator choosing any seat next to a student. This is to facilitate a non-threatening environment for students to openly talk about their experience in the simulation scenario. Both the direct participants and the observers will join the debriefing session to explore their experiences of the simulation scenario.

Some question that can be addressed are:

1. How was your experience of participating in the simulation scenario?
2. How was your experience as an observer in the simulation scenario?
3. How do you feel about your performance?
4. How do you feel about the group performance?
5. What went well?
6. What could have been done differently?

The facilitator should also be available to respond to any comments and concerns. If there were concerns or unexpected events that did arise during the scenario, it should also be dealt with using a good judgement model approach. The debriefing session should last approximately 25-30 minutes.

## **CONCLUSION**

This simulation learning package is designed for teaching of students midwives on how to manage post-partum haemorrhage which is a major avoidable cause of maternal deaths in South Africa, Africa and worldwide. Using this simulation learning package is an innovative method of teaching and learning as it involves the use of the “SimMom” which is high fidelity patient simulator programmed with the Laerdal Medical SimMom Instructor Software and the Elo Software Touch System. This learning package focuses exclusively on managing post-partum haemorrhage as an obstetric emergency. It can be used as the foundation for developing other simulation learning packages that will enhance basic and advanced best practices in clinical nursing and nursing education.

It is a new, creative, safe and technologically advanced method of teaching students in an almost real to life scenario setting.

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Annexure 12: The Transcript of a focus group session

Date: 29 October 2015

Time: 10h20- 11h10

Venue: RK Khan Hospital – Maternity Ward M1.

Participants: 8 Midwifery undergraduate students

Tapescript: Audio recording

*Interviewer:* We are running a focus group sessions with students who were involved in a simulation session 2 weeks ago. So, how did you feel about the simulation session?

*Participant:* About the simulation that was done, I feel that it was very effective and that the students showed that they knew what they were doing. (Short pause) There was a lot of skills and they really done a good job and the fact that they had a previous lecture on it, so doing it was much easier with that knowledge. So you putting all the theory into practice which makes it easier when you go to the practical placement. Because now if you already like know the theory behind it, when you see something now, it is more effective and you can put the words into action.

*Participant:* Umm, I felt that it was very helpful because ehh especially us getting to watch the video. Like when you see something it helps you remember. I don't know, I have a way of studying like using visuals. And also getting the students to do the simulation itself is a good way for us to practice our skills and it helped me.

*Participant:* I found the simulation thing very helpful considering that after the lecture I did not understand much but after going through the simulation I found that I understand much much more. It helped me to actually know what I was doing and to highlight other areas as well where I need to develop further.

*Interviewer:* What are some of these areas that you need to develop and you also mentioned that it was helpful. How was it beneficial?

*Participant:* The skills I am talking about such as delegation, working as a team, was able to delegate effectively. Making sure team knew what to do in terms of remembering what to do.

*Participant:* to agree with XXXX, when you go to the practical placement, it is the actual thing that is happening. The team effort always emphasize that you work as a team. If things are

done in a team it is much easier and effectively done... taking skills and putting it in the practical placement and doing it in the right way.

*Participant:* and I felt like it was different from doing a competency like we have been doing in the past years where we just crammed whatever was in the paper just to get the competency done. But with simulation you are able to learn whatever theory and then try to apply the practicals. Then you are able to see where you went wrong.

*Participant:* I felt that simulation was very good because when you study the theory and you just reading or you are being told that in a lecture, then you just cram so that you can write it in exams and then you get proof of testing and when you use simulation, it helps you remember what you did before and it also boosts your confidence because if you know, you have done it, you can do it in the clinical setting as well. It is more practical, the more it is done.

*Participant:* I actually seen it being done. Just another way of remembering and visualizing and identify any gaps.

*Participant:* So where you able to spot where the gaps were like they were supposed to have done this or that? I feel it will also affect the stigma that all university students are just theory based so know when you know the theory it also much easier to also do whatever that comes up in the practical situation.

*Participant:* And I was also impressed that with just a few lectures using simulation and how they were doing it, dedication was seen. When we go to the clinical setting we know what is expected of us. And the simulation makes it real.

*Interviewer:* From the comments received in the first focus group, it seem as if students felt they were able to critically evaluate the students. Some type of peer evaluation, did you also feel that way?

*Participant:* Yes, There is because if you look at how the team leader was delegating the work, you can relate to it that the students were doing a good job. Like you would think now that it is someone who does the job often but no she only got a few experiences and she was able to do it. It is like it was not run by a student, you will think that it was really run by a midwife.

*Participant:* I think like watching the video and seeing it. Because sometimes when something is happening, you miss a lot of things but when you watch it and you see what happens, then you are able to pick what went wrong and what you didn't do. And then you not only evaluating them but you also evaluating yourself and you can see that I didn't do

this. Or that so when you are in the clinical area, you can remember and have that at the back of your mind and think that I should do this when I was watching the video.

*Interviewer:* How did it help you?

*Participant:* like for me, now in exams I can just go back and think about the video and then I will remember I need to put two drip lines. Then to do vital signs and also the rubbing up of the fundus and just give a quick recall of the information of what was done because of visuals you can paint a picture back and fill in the gaps and write because we do have the knowledge now.

*Participant:* Ya, I think as she said. I think with simulation, you can actually see correlation of theory and practice and it highlights how it should be done.

*Participant:* For me, I think when there are obstetric emergencies in the ward, I panic and wait for someone to tell me what to do and I do the very minimal thing. Now with PPH, I find that I am more confident and that because we did the whole simulation thing, I know what to do more than I would for any other obstetric emergency because I have seen it and we discussed it. Even with the ESMOE training, the simulation was better because we actually seen it and done it.

*Participant:* We had a patient a week after the whole simulation thing and I was really able to help because I knew what to do. It boosted our confidence after the simulation.

*Participant:* we also had a case and it was really easy.

*Interviewer:* so when you had this opportunity to witness this case in reality- where you physically involved? What role did you play?

*Participant:* I helped with catheterizing the patient, putting up IV lines and vital signs. I found it very similar to the simulation. I was able to relate back to it and see what they were saying and doing.

*Participant:* The fact that we were shining (giggling), then you become proud. It actually boosted confidence in participating in an emergency itself. When we qualify we won't shy away. We will be proud sisters.

*Participant:* it should have been done earlier because it made us feel a lot more confident and I think that if we go back we should know how to do it.

*Participant:* It shouldn't only just be done in midwifery but throughout especially in general nursing. There are a lot of things in general like in an emergency you stand as far as possible. Like in a resus there only show you how to do it and if they do that like using simulation with

a team, it will make learning be more effective. When you are doing it on a participant that does not react it is not a comparison to what you are doing. You can just confess it or verbalize it and it is taken as part of a competency but with simulation, you can remember from micro-memory what you did or what others were doing at the same time.

*Participant:* Sometimes you are willing to learn but in a resus situation you cant just stand there and see, you can only perform according to what they say is your scope. So this simulation helps. You will do what you know.

*Participant:* You would not feel useless in that situation. You know that if I think back from the experience I had in July soon after we started the course, there was a patient who had an eclamptic fit. I went and started helping other patients because I didn't know what to do. But now that has changed especially in PPH because you feel that you wont stand but get involved and help.

*Interviewer:* did you feel that you needed more support?

*Participant:* No (All Together- then giggles)

*Participant:* we found it to be adequate

*Participant:* it was adequate

*Participant:* Maybe we did not understand it but with simulation we understood it better.

*Interviewer:* How did you feel about making decisions during the simulation?

*Participant:* had to learn how to think on your feet. Think quickly and check with the person delegating that you are doing the right thing. So you also double checking.

*Interviewer:* how did you feel about the guidelines put up on the Moodle site and was it beneficial?

*Participant:* Yes, we had only the lecture. It would have affected the role play. It made the lecture more effective.

*Participant:* Guidelines helped to show you how to conduct PPH. Sometimes the lectures are long and you lose focus and interest. Not everything that is said to you is captured. Even if you write it down. So the guidelines help you to think back at the lecture and when you read the guidelines you can remember what you were taught and if it was not posted, I think the simulation was not going to turn out very well.



*Participant:* From simulation it was more effective than just reading from a book. So I think it was effective.

*Interviewer:* so what did you think about teamwork?

*Participant:* it highlighted importance of working in a team and the way in which the team should work. I found that the team leader was very [ehh]. The way she was delegating was very effective and the way she was giving orders, she was not commanding but simply asking. And checking what you are doing and I think you won't be able to manage such a thing on your own.

*Interviewer:* Describe the simulation session/ experience?

*Participant:* It was very educational, beneficial, effective, comfortable, gained confidence.

*Participant:* Tip top- every action was done accordingly

*Participant:* If the team could handle the situation from lecture and practice- in the past you learned because you had to. But this is to stay with you.

*Interviewer:* Do you think that simulation should be introduced in other levels for future teaching purposes?

*Participant:* Yes definitely. A lot of things especially from last year, this is something that is really needed.

*Participant:* was able to retain more information.

*Participant:* Feelings towards simulation is that what the text book tell you, you cannot see. You don't know how it looks but with simulation you can link it to the clinical situation. You know you have seen this before.

*Participant:* Trial and error cannot be done on a real patient. Compared with manikins, vital signs give some realness.

*Participant:* Self-effective for simulation- team leader kept reassuring the patient and the partner.

*Participant:* SimMom responds like a real patient. You can speak to the SimMom and especially with vital signs compared to other manikins.

*Participant:* You actually have to monitor vital signs and you did not know what to expect added on to the realness of the situation.

*Participant:* I was not scared about that because I could see the management was effective because I knew the management and the patient was improving.

*Participant:* it was good because the patient was improved. She was stable. Felt more confident to work in a ward situation that you could manage using guidelines and if it was not then she could have the next step pulled out.

*Participant:* SimMom, you can see that she is doing well or deteriorates and start second line management. With other manikins, because they are so unresponsive, you just say that you expect the condition to improve and the vital signs are just done, whereas with SimMom it is really happening and that is it.

*Interviewer:* How did you feel about including the husband in the scenario?

*Participant:* For me the husband should be outside. You should manage the patient well and once the patient is stable then call the relative inside. When you manage the patient you may also need someone for support and reassurance.

*Participant:* For the practical setting other mothers are also delivering so the relative should wait outside. But if it is a private room then its okay.

*Participant:* The relative can disrupt what is being done. Relatives can panic. Not always have a positive effect on patient. Sometimes if something goes wrong, the relatives can fight with the doctors. Therefore they should wait outside. You also have to look at the situation holistically. If relative is present sometime you have to manage both.

*Interviewer:* Okay I think that brings us to the end of this focus group discussion. Thank you all for your time. This is much appreciated.

Session completed at 11h10.

Annexure 13: Permission Letter 1

**From:** Michael Scriven [<mailto:mjscriv1@gmail.com>]

**Sent:** Saturday, January 31, 2015 7:10 AM

**To:** Hafaza Amod

**Subject:** Fwd: Permission to use A research tool

Dear Mrs. Hafaza Bibi Amod,

Thank you for your email of January 28. Your work sounds both interesting and valuable, or is a great combination!

You have my permission to use the KEC for assistance in your masters degree work, but not for distribution in packages where any charge is made.

Be sure to look carefully at my checklist for the Evaluation of Training, which can also be found at [michaelscriven.info](http://michaelscriven.info).

And good luck with your work, in the field as well as in the University in Natal.

Best Wishes,

Michael Scriven

PS Please send any future correspondence to this email address as I don't check the other one as often, though my secretary does check it from time to time.

----- Forwarded message -----

From: <[mjs@michaelscriven.info](mailto:mjs@michaelscriven.info)>

Date: Wed, Jan 28, 2015 at 8:54 PM

Subject: Fwd: Permission to use A research tool

To: [mjscriv1@gmail.com](mailto:mjscriv1@gmail.com)

-----Original Message-----

**From:** Hafaza Amod [<mailto:Amodh@ukzn.ac.za>]

**Sent:** Friday, January 23, 2015 07:52 AM

**To:** [mjs@MichaelScriven.info](mailto:mjs@MichaelScriven.info)

**Subject:** RE: Permission to use A research tool

Dear Researcher/ Professor

I am a student from South Africa who is currently engaged in a research project in fulfillment of the requirements for a full Master's degree in Nursing at the University of KwaZulu Natal.

My topic is on developing, implementing and evaluating a simulation package on post-partum haemorrhage for undergraduate midwifery students. In my research, among other evaluations methods, I will be evaluating a simulation learning package. During my literature review, I viewed your evaluation tool/ checklist: "Key evaluation checklist" which I found to be very appropriate to my study.

I would therefore like to request permission to use and adapt this tool to suit my research project.

Kindly contact me via this email address for further correspondence : [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

Regards

Mrs Hafaza Bibi Amod

Midwifery Tutor/ Facilitator

UKZN- Howard Campus

--

Michael Scriven, D.Phil., D.Ed.

Professor of Psychology

Co-Director of the Claremont Evaluation Center

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[415-785-7347](tel:415-785-7347)

## Annexure 14: Permission Letter 2

Dear Hafaza,

We are happy for you to use and adapt our tool as you see fit.

I have attached the codebook for this study which includes the survey questions in the left hand column and the relevant coding in the right hand column.

All the best in your research.

Kind regards,

Mary

Mary Nevin

Clinical Nurse Tutor

School of Nursing and Midwifery,

Trinity College Dublin,

24 D'Olier Street,

Dublin 2

Tel: +353(0) 18963975

Email: [nevinm@tcd.ie](mailto:nevinm@tcd.ie)

<http://www.nursing-midwifery.tcd.ie>

**From:** Hafaza Amod [<mailto:Amodh@ukzn.ac.za>]

**Sent:** 23 January 2015 12:43

**To:** Mary Nevin

**Cc:** Freda Neill; James Mulkerrins

**Subject:** RE: permission to use research tool

Dear Researchers

I am a student from South Africa who is currently engaged in a research project in fulfillment of the requirements for a full Master's degree in Nursing at the University of KwaZulu Natal.

My topic is on developing, implementing and evaluating a simulation package on post-partum haemorrhage for undergraduate midwifery students. In my research, among other evaluations methods, I will be evaluating student satisfaction in simulation training. During my literature review, I have read your article in the Elsevier Journal, March 2014 titled, "Preparing the nursing students for internship in a pre-registration program: Developing a problem-based approach with the use of high fidelity simulation equipment." I found the tool used very appropriate to my study.

I would therefore like to request permission to use and adapt this tool to suit my research project.

Kindly inform me via this email address: [Amodh@ukzn.ac.za](mailto:Amodh@ukzn.ac.za)

Regards

Mrs Hafaza Bibi Amod

Midwifery Tutor/ Facilitator

UKZN- Howard Campus

## Annexure 15. Ethical Approval

Annexure 16: Editor's report