PERCEPTIONS OF DIPLOMA NURSING AND MIDWIFERY STUDENTS ON SIMULATION-BASED EDUCATION AT HAYDOM INSTITUTE OF HEALTH SCIENCES IN NORTHERN TANZANIA

MSc (Midwifery) Thesis

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KAMUZU UNIVERSITY OF HEALTH SCIENCS

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CERTIFICATE OF APPROVAL

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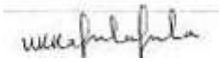
Signature:  Date: **April 2025**

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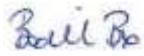
Signature:  Date: **April 2025**

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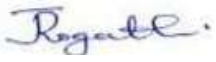
Signature:  Date: **April 2025**

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DECLARATION

I, **Wilson Saimon Eliamini** declares that this dissertation is my own original work and that it has not been presented, and will not be presented, to any other university for a similar or any other degree award, and is not previously or currently under copyright.

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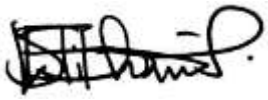

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ABSTRACT

Traditional teaching approaches are not very effective in enhancing students' knowledge, abilities, and attitudes. Simulation-Based Education has been shown to be successful in boosting students' learning. Nevertheless, many nursing and midwifery schools in Low- and Middle-Income Countries, notably those in Sub-Saharan Africa, continue to be dominated by traditional didactic methods. In Tanzania, the adoption of Simulation-Based Education as a teaching method in nursing and midwifery programmes is still low and Haydom Institute of Health Sciences in Northern Tanzania implements it since 2017. Although anecdotal evidence suggests that simulation continues to be used, there is a scarcity of literature on students' perceptions on simulation-based education since its inauguration. To explore the perceptions of nursing and midwifery students on simulation-based education in Haydom Institute of Health Sciences. This study used an exploratory-descriptive qualitative study design. The study was conducted at Haydom Institute of Health Sciences among population third year nursing and midwifery students. A purposive sampling technique was used to select 31participants in five focus group discussions. Thematic analysis according to Braun & Clarke (2006) was used. The study was approved by KCMU CRERC and COMREC. Participants' human rights were maintained throughout the study. The analysis of qualitative data resulted into four themes and thirteen subthemes. The identified themes were: Experiences of simulation-based education among the nursing students; Perceived benefits of simulation-based education among the nursing students; Perceived challenges faced by nursing students during simulation-based education and Perspectives on how to improve simulation-based education. Conclusion: Perceptions of diploma in nursing and midwifery students indicate that Simulation-Based Education is a highly effective teaching method even in limited resource settings. Although nursing and midwifery students had limited access to Simulation-Based Education, it stands to be a valuable teaching approach for developing practical skills. This positive feedback highlights the role of Simulation-Based Education in enhancing learning and preparation for real clinical situations.

TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

BScN	Bachelor of Science in Nursing
CBET	Competence Based Educational Training
COMREC	College of Medicine Research and Ethics Committee
EDQ	Exploratory-Descriptive Qualitative
ELCT	Evangelical Lutheran Church of Tanzania
FGD	Focus Group Discussion
HFS	High Fidelity Simulation
HIHS	Haydom Institute of Health Sciences
KCMUCo	Kilimanjaro Christian Medical University College
LFS	Low Fidelity Simulation
LMICs	Low- and Middle-Income Countries
MFS	Medium Fidelity Simulation
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
NACTE	National Council for Technical Education
NIMR	National Institute for Medical Research
NORHED II	Norwegian Programme for Capacity Development in Higher Education and Research for Development
PPH	Postpartum Hemorrhage
RCT	Randomized Controlled Trial
SBE	Simulation-based education
WHO	World Health Organization

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

Simulation is a method that creates a situation or an environment that makes people experience a representation or depiction of a real event for the purpose of learning, practice, evaluation, testing or gaining insight on how systems work or how humans behave (Lioce et al., 2020). In healthcare, simulation is an approach that sets up a scenario or atmosphere so that people can experience a representation of a real healthcare event for the purpose of training, education, testing, or understanding systems or human behavior (Lioce et al., 2020). Simulation provides a safe learning environment in which students can learn and apply their theoretical knowledge (Botma, 2014; Egenberg et al., 2017) and eventually reduce errors for students when they interact with real patients (Amado et al., 2012). The World Health Organization (WHO, 2018) highly recommends simulation-based education (SBE) because it also promotes patients' safety.

The first WHO (2013) guideline for transforming and scaling up health professionals' education and training strongly recommends the use of SBE in health training institutions. In order to support nursing and midwifery educators in application of this teaching strategy, WHO (2018) developed a guideline for simulation in nursing and midwifery education. The main goal of the guideline is to help educators understand key aspects of simulation that can be tailored to specific cultural, educational, and professional realities. Furthermore, one of the policy priorities for the global strategic directions for nursing and midwifery 2021 to 2025 by WHO (2021) requires educators to be properly trained in the best educational methods and technologies including SBE.

There is sufficient evidence that SBE is effective compared to traditional didactic methods in teaching students in medical, nursing, midwifery, dental and other health science programmes both in high- and low-income countries (WHO, 2018). For example, Chen et al. (2017) reports in their systematic review that students taught through SBE had enhanced knowledge and skills acquisition compared to those in a non-simulation group (didactic method). Furthermore, when compared to the didactic method, SBE was found to improve patient outcomes because after learning in a simulation laboratory, students transferred skills to the clinical setting. In addition, Kumar et al. (2016) in their randomized controlled trial (RCT) concluded that as a pedagogic method, SBE resulted in a better understanding of the subject matter compared to the traditional didactic method (Kumar et al., 2016). This generally means, didactic methods of teaching have limited effectiveness in improving students' knowledge, skills and attitudes. Traditional didactic methods have been found to be less effective in imparting essential healthcare skills and competencies required for modern healthcare practice (Angelina et al., 2021). However, the use of SBE in health training institutions including nursing and midwifery varies greatly around the world.

Literature demonstrates that SBE has expanded in scope and application in developed countries since the nineteenth century. Currently, low fidelity models that are used to train simple procedures are being replaced by medium and high fidelity models (Oliveira et al., 2014). However, in low resource settings, there is insufficient implementation of SBE as a pedagogic method (Bø et al., 2022). Puri et al. (2017) performed a scoping review of published studies on SBE in low- and middle-income countries (LMICs) and found that globally, there was low utilization of SBE in LMICs. In

that review, research studies published on SBE in LMICs according to World Bank defined geographical regions were: Sub-Saharan Africa 26%; East Asia and Pacific 21%; Latin America and Caribbean 18%; Middle East and North Africa 15%; Europe and South Asia 1%. This means, traditional methods of knowledge and skill transfer still dominate many nursing and midwifery programme curricula in LMICs including Sub-Saharan Africa.

In Tanzania, the national curriculum for nursing and midwifery education specifically mentions simulation as one of the teaching methods (Tanzania Ministry of Health, 2017); However its uptake is very limited (Bø et al., 2022). This suggests that WHO recommendations on SBE have been adopted theoretically, but their practical implementation is lacking. This may be attributed to factors such as the lack of simulation culture and training, insufficient time and lack of infrastructure for conducting simulations (Seethamraju et al., 2022). Additionally, high number of students, which strains the available resources, and the difficulties in integrating SBE into an already congested teaching schedule and curriculum are vital challenges which hamper the adoption of SBE in a Tanzania (Tjoflåt et al., 2021). These factors generally demonstrate that, SBE as a pedagogic method has not been given its deserved attention in many nursing and midwifery training institutions in Tanzania.

The documented effectiveness of SBE in comparison to traditional didactic methods makes it a significant approach for teaching in nursing and midwifery institutions. Research has demonstrated that positive student perceptions of a subject and its teaching methods are linked to higher academic performance. According to Ferreira & Santoso (2008) students with negative or poor perceptions of a subject or its teaching methods tend to perform poorly. Since SBE is a relatively new teaching method in Sub-Saharan Africa,

it is essential to evaluate students' perceptions to assess its acceptance and perceived benefits for their learning. Exploring students' perceptions of SBE will provide insights into how this approach is viewed by students and its potential benefits in the Tanzanian context, highlighting the need for this study. Therefore, this study aimed at exploring the perceptions of nursing and midwifery students on simulation-based education in Haydom Institute of Health Sciences.

1.2 Background

Globally, the use of SBE in nursing and midwifery education involves both low and high-fidelity simulation. Fidelity in SBE can be categorized into three types which are low, moderate/medium and high-fidelity (Shaaban et al., 2021). Low fidelity simulation (LFS) is the one that uses simulators which are static non- computerized manikins or task-trainers. Low-fidelity simulators are often used for basic procedures that do not require advanced technology to operate such as insertion of intravenous catheter, insertion of nasogastric among others. Moderate fidelity simulation (MFS) is the one which uses simulators that use standardized patients or computer programmes with less realism. High fidelity simulation (HFS) uses computerized manikins to simulate physical phenomena like heartbeats, breath sounds, and body pulses. High fidelity manikins can react to student's interventions, voices complaints about its health and can participate in conversations with the facilitator in the control room while using a microphone (Shaaban et al., 2021). High fidelity simulators are often used for complex procedures such as resuscitation of the new born that require patients' response like voice complains, breath sounds, heartbeats among others.

The use of either low-, moderate- or high-fidelity in nursing and midwifery education depends on the kind of procedure or skill to be taught and varies across the world (Oliveira et al., 2014). In Europe, according to Chabrera et al. (2021), HFS has been used for over 18 years in Czech Republic, 10 years in Spain and other countries like Russia and Italy have recently started to implement SBE. The study also demonstrated that more hours were spent in low- and moderate fidelity compared to HFS. In SSA, a survey in Ghana on knowledge and practice of simulation among health tutors revealed that 69% of participants practiced SBE. The survey also revealed that LFS was utilized by 31% followed by MFS 28% and HFS 8%. It can be concluded from the study that LFS and MFS were mostly used in training students especially in low and middle income countries (Ategtoore et al., 2023). This suggests that high-fidelity simulators are rare in health training institutions in resource-constrained regions, likely due to the high costs of purchasing and maintaining the equipment, technological challenges, and time limitations (Delisle & Hannenberg, 2020).

Simulation-based education is often used by health care practitioners and students before and/or during clinical training. It is an effective method for imparting, acquiring, and assessing clinical competencies at all stages of nursing and midwifery education (Park et al., 2016). It is proven to be effective and useful in improving students' learning (Botma, 2014). In the field of nursing and midwifery the main goal of SBE is to prepare students for the transition into the actual clinical practice (Bryant et al., 2020) as well as to improve quality of care and ensure patients' safety (WHO, 2018). SBE is used to teach a variety of clinical skills and clinical procedures to various health care professions.

The WHO (2013) highly recommends the use of simulation in health training institutions in order to transform and scale up health professionals' training and education. In their integrative review Oliveira et al. (2014) found that SBE contributes to learners' improvement of knowledge, skills and attitude. Example, Oliveira et al. (2014) reported that students' knowledge was improved on patient safety, intensive care, oxygen therapy, mastectomy, pharmacology, clinical psychiatry, physical evaluation and ethics among others. Additionally, skills like drugs administration, venous catheterization, infection control, vital signs, sample collection and wound dressing were sufficiently learnt through SBE. Together with that learners' attitudes (behavioral and emotional) like improvements on interprofessional collaboration, ethics, empathy, responsibility, self-evaluation and autonomy were both improved with SBE (Oliveira et al., 2014).

In addition, clinical procedures such as helping babies breathe (Bucher et al., 2020), postpartum hemorrhage (PPH) (Angelina et al., 2021; Egenberg et al., 2017), intraosseous insertion (Mikrogianakis et al., 2011), assisting a woman during delivery (Zhao et al., 2019) among others can successfully be learnt through SBE. The effectiveness of learning these skills and procedures using traditional didactic lecture method is found to be low compared to SBE (Chen et al., 2017). Generally, introduction of high-fidelity patient simulators which can give physiological response to an intervention allows for high levels of realism in simulations and improves the learning for various technical and non-technical skills (Amado et al., 2012).

In low- and middle-income countries, there is little implementation of SBE as a pedagogical method in nursing and midwifery education (Bø et al., 2022; Livingston et al., 2014). Few studies can be found in African countries, indicating that little has been done

to implement SBE as a pedagogical method in nursing and midwifery education. Example in Lesotho, a study on perception of students' support on, during and after SBE was done in four institutions and found that students were sufficiently supported throughout the process (Moabi, 2022). Another implementation study done in Tanzania and Madagascar found that nurse and midwife educators acknowledged and considered SBE as a valuable approach in imparting knowledge to students while also reporting few challenges such as limited number of staff (Tjoflåt et al., 2021). Other challenges that hinder the implementation of SBE are time constraints, high costs of purchasing and maintaining equipment, lack of trainings for SBE and lack of support from institutions' managements (Delisle & Hannenberg, 2020; Seethamraju et al., 2022). SBE can be used for professional development among health care professionals in addition to teaching students in training institutions.

In Ethiopia, a pilot study on simulation-based training for skilled birth attendants found that it was a feasible, effective and acceptable method of teaching. Learners had significant increase in knowledge (Zhao et al., 2019). In Tanzania, a multi-professional simulation training on postpartum hemorrhage (PPH) revealed that team and skills training, realistic and repetition of scenarios with subsequent debriefing for reflective learning were all critical for improved teamwork. Following training, participants' confidence increased, their stress levels decreased, and they felt confident that they could provide better maternal services (Egenberg et al., 2017).

1.2.1 Simulation-Based Education as a Pedagogic Method in Tanzania

In Tanzania, majority of nursing and midwifery training institutions still use didactic methods of learning described in their curriculums such as lectures, lecture

discussion, tutorials, assignments, demonstration, skills laboratory practice, study tours, case study, role plays, group discussion and field visits (Tanzania Ministry of Health, 2017). Little has been done regarding the implementation of SBE as a pedagogic method in nursing and midwifery education. Currently, only Haydom Institute of Health Sciences (HIHS) implements SBE in accordance with curriculum and WHO recommendations. In HIHS, SBE was introduced in 2017 by a Norwegian collaborative project aiming at implementing SBE as a pedagogic method in nursing and midwifery programmes in low-resource settings (Bø et al., 2022; Tjoflåt et al., 2017). This project was implemented in Tanzania and Madagascar in health training institutions both offering diploma in nursing and midwifery education. During the project's implementation Tjoflåt et al. (2021) provided training on SBE to tutors. The training covered the theoretical aspects of SBE, including definitions, various types of SBE, its benefits, supporting theories, how to conduct SBE, the steps involved, and scenario development. Additionally, practical sessions were conducted, during which Tjoflåt et al. (2021)and their team facilitated the actual simulation practice with tutors as participants, later allowing them to assume the role of facilitators. The findings revealed educators' satisfaction and positive reception of this learning approach. Anecdotal evidence from HIHS indicates that, after its implementation, SBE specifically using low and medium fidelity simulators is still being used as a teaching method. However, literature indicates scarcity in studies on students' perceptions towards SBE since its inception at HIHS.

Therefore, the current study will explore the perceptions of nursing and midwifery students on SBE at HIHS where SBE has recently begun to be implemented.

1.3 Problem Statement

There is sufficient evidence that SBE as an innovative pedagogic method is useful and effective in improving students' learning compared to traditional didactic methods which have limited effectiveness in improving students' knowledge, skills and attitude (Botma, 2014; Chen et al., 2017; Kumar et al., 2016; WHO, 2018). The WHO (2013) requires all nursing and midwifery training institutions to integrate SBE in their curricula as a teaching approach in order to transform systems and move away from ineffective traditional focus. This is essential to ensure that graduating health care professionals possess the necessary skills and competencies to meet the dynamic and evolving needs of populations worldwide.

In developed countries SBE has significantly expanded both in its scope and application since the nineteenth century. However, in LMICs including Sub-Saharan Africa, traditional methods of knowledge and skills transfer especially in the skills lab such as demonstrations still dominate nursing and midwifery institutions (Puri et al., 2017). This shows that uptake of SBE for nursing and midwifery education in low resource settings is still limited (Bø et al., 2022). This hinders students' ability to gain exposure to clinical settings, as they lack access to a similar, yet non-realistic environment in which they can develop their confidence, skills, and competence.

In Haydom Institute of Health Sciences, SBE was introduced in 2017 by a Norwegian collaborative project aiming at implementing SBE as a pedagogic method in nursing and midwifery programmes in low-resource settings (Bø et al., 2022; Tjoflåt et al., 2017). A study on nurse educators' perspectives on this teaching approach was then conducted (Tjoflåt et al., 2021); However, the literature reveals a scarcity of studies on

students' perceptions of SBE as a pedagogical method since its introduction at HIHS. Investigating students' perceptions of SBE in a low-resource setting will provide insights into how the method has been received and its relevance as a learning tool in such contexts. This is important, as positive perceptions of both the subject and its teaching methods are linked to improved academic performance (Ferreira & Santoso, 2008). Therefore, there is a need for a study to explore students' perceptions on simulation-based education as a pedagogic method in HIHS hence a need for this study.

1.4 Rationale for the Study

According to recommendation number five of the WHO (2013) transforming and scaling up of health professionals' training, health professionals' education and training institutions should use simulation methods**.** The guideline recommends high fidelity simulation methods for institutions with adequate resources and low fidelity for resource limited settings. This means, SBE can be implemented even in low-resource settings.

The fact that SBE is still a novel way of teaching in nursing and midwifery training institutions in Tanzania, it is critical to obtain students' perception on it. This will be helpful in understanding how this teaching approach has been received by students, any perceived advantages and difficulties, as well as how to make it better. The findings of this study will help raise awareness of SBE and may influence other nursing and midwifery institutions in Tanzania to adopt it.

1.5 Objectives

1.5.1 Broad Objective

The main objective for the study was to explore the perceptions of nursing and midwifery students in simulation-based education in Haydom Institute of Health Sciences.

1.5.2 Specific Objectives

Specifically, the study was conducted to:

1. Explore students' experiences in simulation-based education.
2. Identify students' perceived benefits of simulation-based education.
3. Identify challenges that students face when learning through simulation-based.
4. Explore student's perspectives on how to improve simulation-based education.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The literature review presented in this study is guided by the study objectives. A comprehensive search using computer was conducted in various online databases such as PubMed, Google Scholar, Cumulative Index of Nursing and Allied Health Literature (CINAHL), WHO websites and International Nursing Association for Clinical Simulation and Learning (INACSL) were used.

The search was conducted using study titles and abstracts. Only peer reviewed articles published in English from 2013 to 2023 were included. The 10 years range of time was selected in order to provide a wide range of up to date information. Only peer reviewed articles were selected because of their trustworthiness in academics. Articles in English language were selected to ensure understanding by the researcher and because the dissertation is written in English.

Search terms that were used in different online databases were simulation-based education, simulation-based learning, simulations, perceptions, challenges, benefits, experiences, and suggestions for improvements, recommendations for improvement, nursing and midwifery education. Boolean operators AND, OR, NOT was used to combine or exclude key words in a search. Headings that are used in this literature review were based on the objectives of the study.

2.2 Students' Experiences with Simulation-Based Education

Nursing and midwifery students have variety of experiences with SBE involving low, medium and high-fidelity simulators. In this literature review, these experiences are

grouped into four major groups which are experiences during briefing phase, simulation scenario phase, debriefing phase and experiences after simulation.

2.2.1 Students' Experiences During Briefing Phase

Briefing phase is the second phase of simulation in which the facilitator gives information about the simulation scenario such as background information, instructions, guidelines for the whole process and distribute roles to students (Lioce et al., 2020). This phase is also defined as a critical step in which guided information is given just before the simulation experience starts (WHO, 2018). The phase is also well established by Hughes & Hughes (2024) that briefing helps participants prepare and understand what to expect, making them feel safer and less nervous. This preparation increases interest and encourages participants to take risks and learn from their mistakes throughout the simulation. As a result, the debriefing session benefits from more open discussions and in-depth insights into the participants' thought processes. Pre-briefing also minimizes learners' defensiveness, resentment, and complaints.

The review of literature indicate that students have variety of experiences during the debriefing phase of simulation. In Korea, Song & Jeong (2015) conducted a study on nursing students experiences with SBE on hypoglycemia and found that the students' first time in the simulation laboratory was quite unfamiliar. The findings suggest that for students who had never been exposed to real clinical settings, the simulation laboratory felt unfamiliar and resembled a real hospital environment. This unfamiliarity made it challenging for the students to grasp their roles as nurses during the simulation. Simulation laboratories are designed to replicate real-world clinical environments as closely as possible to provide students with hands-on learning experiences in a controlled setting

(Lioce et al., 2020). However, the study shows that for students who have never been in a clinical setting before, the simulation lab can be overwhelming and difficult to navigate.

In addition, the debriefing phase was considered very important when students had prior information about the topic that they would learn in that particular simulation. Bø et al. (2022) conducted a study in Tanzania and Madagascar with the aim of introducing and exploring students' experiences with SBE as a pedagogic method. Initially, during the first round of SBE training in their study, students were not provided with any information about the scenario before engaging in the simulation activity. This lack of preparation was reported as challenging because students felt unprepared for what they would encounter during simulation. Upon evaluating their study, adjustments were made where students were given the simulation scenarios at least two or three days in advance of the simulation activity. This modification was made to provide students enough time to become acquainted with the scenario and to read relevant material on the topic to be discussed during the simulation. As a consequence, students reported that having the scenarios ahead of time was advantageous and reassuring, allowing them to approach the simulation activity with more confidence and preparedness.

2.2.2 Students' Experiences During Simulation Scenario Phase

Simulation scenario phase is the third phase in simulation which refers to the designed simulation experience that provide an opportunity for learners to meet their established objectives (Lioce et al., 2020). In the simulation scenario phase, Bø et al. (2022) reported that students found it very important to play both as active participants and active listeners. In the study, students who actively participated in the simulation described it as a valuable opportunity to gain firsthand experience in becoming professional nurses. They

expressed that actively engaging in the simulations allowed them to learn practical skills and procedures more effectively compared to those who only observed. By taking part in the simulations, students were able to directly practice and upgrade their abilities in carrying out real-world nursing procedures. This hands-on experience was seen as crucial in their development and understanding of what it takes to function as competent nurses in real clinical settings.

Additionally, fear and anxiety were reported in several studies as one of the experiences of students during the actual simulation scenario (Bø et al., 2022; Najjar et al., 2015). In their study, Bø et al. (2022) reported that some students felt nervous when performing procedures especially when their peers and teachers were present. This anxiety was due to the perception that teachers possessed greater knowledge compared to students. Najjar et al. (2015) stresses that anxiety increased as the number of students watching the simulation increased. Subsequent findings reporting on the reasons for anxiety during the actual simulation scenario were lack of familiarity with equipment and unanticipated changes during simulation scenario especially for students with less experience in simulation. However, students also acknowledged that anxiety is part of the learning process and so it is impossible to fully eliminate it (Najjar et al., 2015).

Furthermore, students reported that during the simulation scenario they were able to connect to other previous experiences. In their study, Najjar et al. (2015) reported that when concepts taught in class directly applied to the simulation scenario, students found it beneficial and could relate these concepts to their classroom learning. Additionally, students with prior clinical experience were able to draw connections between their previous clinical practice and the simulation activity. However, in cases where previous

clinical exposure differed significantly from the current simulation scenario, this prior experience was sometimes perceived as a hindrance.

Several studies also highlight the importance of students peer-to-peer interaction during simulation (Lesā et al., 2021; Najjar et al., 2015). Lesā et al. (2021) observed that some students found satisfaction in collaborating during simulation appreciating the mutual support among the group members throughout the learning process. According to Najjar et al. (2015), students reported that spending more time together during simulations strengthened their bonds and facilitated easier interpersonal connections.

Najjar et al. (2015) also discussed how fidelity in simulation affects students' experiences, emphasizing how low fidelity simulations were more frustrating than high fidelity ones. Students thought that low fidelity hindered them to perform as desired. For example, they found mechanical heartbeats, lung sounds, and bowel sounds during simulations frustrating because they lacked the realism needed to discern clinical details accurately. Additionally, the use of low fidelity manikins restricted students from performing certain types of skills that they found important according to the presented scenario. Despite these drawbacks, low fidelity simulation is recommended for limited resource settings which cannot afford high fidelity manikins.

2.2.3 Students' Experiences During Debriefing Phase

Debriefing is the final phase of simulation in which the facilitator guides the discussion for the whole simulation activity. It also involves provision of feedback from learners themselves on their performance. This is the phase in which the facilitator fosters students' development of clinical judgment and critical thinking. It consists of an

interactive discussion between students and their facilitators. During this stage, learners acquire a lot of knowledge and learn how to apply it to the real clinical area (Lioce et al., 2020). The debriefing phase of simulation is a critical opportunity to effectively address and rectify gaps in students' clinical knowledge and skills. This phase allows educators and students to collaboratively review the simulation experience in detail, reflecting on both successful actions and areas needing improvement (Martin, 2024).

According to Bø et al. (2022), debriefing phase was perceived as particularly important because students received feedback of what they did right and what they did not do right during the simulation scenario phase. Students further expressed that, by correcting their mistakes or errors during debriefing helped them improve their practice in the real clinical area. As such, students preferred to be corrected in front of their peers during simulation rather than in the presence of nurses, doctors, and patients in the real clinical area.

Furthermore, Najjar et al. (2015) demonstrated that during the debriefing phase, students started to emotionally process their experiences from the simulation activity. The study described that it was very important for students to go through this process because it helped them to actualize the whole process of simulation. Some students could start this process right after simulation activity while others could take few hours or days and some even in informal occasions such as in birthday events or when they chat with friends. The reflection process is also reported to take place in students' minds trying to think through about what they did well and areas that needs to be improved.

2.3 Benefits of Simulation-Based Education

Simulation has numerous advantages for students, tutors, patients and communities, as well as education and health organisations (WHO, 2018). Studies indicate that SBE helps students transition from theory to practice (Botma, 2014; Kaddoura et al., 2016). This method exposes students to an environment that is almost like the real clinical setting thereby preventing the challenge of being overwhelmed in their first clinical encounter with patients. Kaddoura et al. (2016) conducted a study in America to explore perceptions of students on benefits and challenges of exposure to multiple HFS scenarios. The study revealed that students found simulations valuable in bridging the gap between theoretical course content and practical implementation, helping them understand how theoretical concepts can be applied in real-world situations. Botma (2014) identified another crucial element in integrating theory into practice which is understanding how to engage with patients' family members, employing effective communication techniques.

In addition, SBE enhances students' critical thinking skills (Botma, 2014). According to Lioce et al. (2020) debriefing phase of simulation enhances students' critical thinking as it requires the student to give rationale for every action performed during the simulation scenario phase. One study that explored students' perception on SBE reported that SBE is an approach that enabled learners to think critically and make a sound clinical judgment, effectively interpret findings and make decision (Kaddoura et al., 2016). The critical thinking skills acquired during SBE enables students to prioritize patient needs, nursing actions and think about other options available for care of patients in the actual clinical environment (Kaddoura et al., 2016; Lestander et al., 2016).

Several lines of evidence suggest that SBE improves students' self-confidence (Botma, 2014; Kaddoura et al., 2016; Lestander et al., 2016; Khalaila, 2014; Valizadeh et al., 2013). In Israel a study to evaluate student's outcomes after their clinical practice combined with simulation found that SBE reduces anxiety and increases self-confidence during clinical practice (Khalaila, 2014). In America a study on perceived benefits and challenges of repeated exposure to HFS among nursing students found that SBE enabled students to confidently talk to patients, relatives and other health care providers and to work confidently and calmly even in a stressful environment (Kaddoura et al., 2016). In Iran, an RCT study was conducted on peripheral venous catheterization in paediatric patients with one control group and two intervention groups which were demonstration and SBE. The study found that students in the SBE group exhibited higher levels of self-confidence compared to those in the other two groups (Valizadeh et al., 2013). This suggests that exposure to simulations prepares students for their initial experiences in actual clinical settings by familiarizing them with similar environments beforehand.

Kaddoura et al. (2016) propose that simulation-based education enhances students' self-confidence in executing procedures within real clinical settings through repeated exposure to simulations. By engaging in simulated scenarios multiple times, students gain familiarity and proficiency in handling clinical procedures, which translates to increased confidence when they face similar situations in actual clinical practice. In the same vein, Egenberg et al. (2017) further emphasize that having a clear understanding of both the procedures to be performed and how to perform it significantly enhances students' self-confidence in real clinical settings. This comprehension allows healthcare professionals and students to approach patient care with assurance, knowing they have the necessary

knowledge and skills to effectively manage diverse clinical conditions. By acquiring this competence through SBE students and healthcare professionals are better equipped to navigate challenges and deliver high-quality care, thereby fostering a positive impact on patient outcomes and eventually decrease anxiety.

On the contrary, Lestander et al. (2016) reports feelings of stress and anxiety by students during simulations. The study found that anxiety increased as the simulated patient's condition worsened during SBE, which hindered students' ability to effectively integrate theoretical knowledge into practical application. Bø et al. (2022) adds that performing procedures in the presence of lecturers heightened feelings of stress and anxiety among students due to the perceived knowledge gap between lecturers and students. The presence of lecturers, who are seen as possessing greater expertise and authority, created a sense of pressure for students to perform at a high standard. However, some educators argue that anxiety experienced during simulation should not be perceived negatively as it mirrors the stress present in real clinical environments. So, multiple exposures to SBE, may eventually make students practice with less stress (Foronda et al., 2013).

Simulation enables students to learn together and develops the spirit of working in a team (Felton et al., 2013; Lestander et al.; 2016; Egenberg et al., 2017). Lestander et al. (2016) in Sweden studied nursing students' perceptions of learning after HFS and found that students enjoyed working with peers. Their research findings also indicated that learning alongside peers helped students realize the importance of seeking assistance from colleagues when needed. Consequently, students learned that patient care is typically a collaborative effort within a team rather than an individual endeavor. Likewise, Felton et al. (2013) in the UK found that observing a fellow student performing a procedure provided

an additional opportunity for learning, as it allowed students to witness practical application in real-time. This firsthand observation not only reinforced theoretical understanding but also provided valuable insights and techniques involved in performing clinical procedures effectively. In addition, SBE helps in building the spirit of team work and a shared understanding and responsibility (Egenberg et al., 2017). Having a shared understanding and responsibility, helps students and healthcare professionals to work efficiently and harmoniously in a team.

Simulation has also been found to enable students to identify their knowledge deficit or gap (Kaddoura et al., 2016; Lestander et al., 2016). Kaddoura et al. (2016) reported that simulations challenged students' knowledge and exposed areas where they had not learned in class and where they should improve their practice. The study expressed uncertainties which students about executing specific interventions and linking assessments to interventions. SBE identified these gaps as opportunities for further learning and facilitated self-awareness through feedback received from peers and facilitators during debriefing sessions. Lestander et al. (2016) described that the knowledge gap identified during SBE obligated students to learn more and that stirred up their interest for the next simulation session. However, conversely, experiencing a deficit in knowledge was also noted to evoke feelings of inadequacy among students. When faced with gaps in understanding or skills, students perceived themselves as lacking the necessary competence or preparedness (Lestander et al., 2016). It can probably be argued that negative feelings experienced are part of human reactions to disappointments.

SBE offers a chance of repeating the procedure in a safe environment (WHO, 2018). Egenberg et al. (2017) reports that learning through simulation increased realism as well

as the chance to repeat the procedure. The study further emphasized the significance of repetition in the learning process, noting that performing a task multiple times was crucial for behavior change to occur effectively. Repeated practice allowed healthcare professionals involved in the study to refine their skills, internalize correct procedures, and ultimately improve their proficiency and confidence in executing tasks. According to WHO (2018), one of the core goals of SBE is to ensure patients' safety. Patients' safety is achieved through SBE by repeating procedures several times along with correcting mistakes in the process to enable perfection of skills before students are exposed to real clinical area.

2.4 Challenges Faced by Students During Simulation

Despite the numerous benefits associated with student engagement in SBE, there are inherent challenges encountered during the learning process. One of the key challenges faced by students during SBE is the overwhelming sense of cognitive and emotional strain (Kaddoura et al., 2016). The study found that some students felt overwhelmed by the sudden changes in the simulated patient's condition and struggled to prioritize which issue to address first. In order to address the issue of overwhelming situations during SBE, the study proposed that facilitators consider the psychological impacts of stressful scenarios and advised evaluating students' psychological and emotional states following each procedure (Kaddoura et al., 2016).

Furthermore, simulation was perceived to lack authenticity (Lesā et al., 2021). While SBE is valued for its ability to bridge the gap between theoretical knowledge and clinical practice by providing practical experience, there are instances where it is perceived as lacking authenticity. Findings from Lesā et al. (2021) revealed that although the

simulation laboratory was accurately designed to replicate a real clinical setting, some participants noted that providing care to manikins did not perfectly reflect the true clinical environment. Manikins lacked social interaction, warm skin, and simply stood there staring. Alinier & Oriot (2022) argues that although simulation as a pedagogical method often falls short of providing a fully authentic experience in some clinical scenarios, it significantly enhances the educational process by offering engaging and relevant learning opportunities. This pedagogical method helps learners develop skills and knowledge in a controlled, safe environment, although discrepancies between simulation and real clinical settings referred to as "ex-reality" must be addressed to ensure effective learning.

Another challenge that learners encounter during SBE is the difficulty of performing role plays. Lesā et al. (2021) in their study aiming at exploring nursing students' experience with learning through SBE found that some students were not comfortable with role playing. Students' verbal reports from the study indicated that some disliked acting and struggled to communicate with manikins, knowing the manikins could not hear them. Likewise, Au et al. (2016) found that some participants showed a unconcerned attitude toward the manikins, treating them with contempt. This behavior likely emerged from their perception that manikins are mere inanimate objects, which affected their engagement and willingness to interact seriously during simulations. Although manikins cannot hear or talk, Lesā et al. (2021) argue that some students interacted positively with them, thereby influencing those who had negative attitudes. This situation highlights the need for a dynamic group rather than a uniform one, as a group that lacks diversity in behavior can become dull.

The process of learning through SBE also led to feelings of disappointment and failure (Lesā et al., 2021). Feelings of disappointment and failure were linked to failing to perform procedures correctly. This self-perception of poor performance was reported to diminish learners' self-confidence. However, these feelings of disappointments and failure can be perceived positively and provide an opportunity to try again because simulation gives a chance to repeat without causing any harm (Lesā et al., 2021). It can probably be argued that experiencing disappointment is a common reaction when someone does not meet the standards or expectations they had.

Eldoushy (2019) highlighted several critical issues faced in the context of SBE, with insufficient time for SBE being one of the most significant challenges. The insufficient time allocated for simulated learning activities restricts students from fully engaging in practical exercises, which are crucial for improving their skills and grasping complex concepts. This limitation undermines their ability to experience and learn from realistic scenarios, ultimately impacting their readiness for real-world applications.

Limited resources for learning is also reported as one of the challenges for implementing SBE especially in limited resource settings (Eldoushy, 2019). The challenge of insufficient resources in SBE is compounded by a lack of qualified personnel, limited numbers of simulators, and inadequate simulation laboratories. These deficiencies can lead to suboptimal learning experiences, as students may not have access to the necessary tools and facilities for effective practice. Consequently, the overall quality of SBE is compromised, potentially hindering students' ability to gain the practical skills and hands-on experience essential for their professional development (Eldoushy, 2019).

Working with people of different personalities during SBE also posed a challenge to the learners. According to Lesā et al. (2021), some students found working together in simulations enjoyable and were pleased with their group members, as they supported each other throughout the learning process. This positive experience was particularly noted by students who had already established friendships before engaging in the simulations, and they found it advantageous to collaborate with people they already knew. On the other hand, some students were dissatisfied with their simulation groups due to personality clashes. Issues such as judgmental attitudes, a competitive spirit and dominant personalities were cited as sources of dissatisfaction and negativity. This might be a frequent issue, which likely explains why students in that study were assigned to the same group for the entire year, allowing them time to become accustomed to each other (Lesā et al., 2021). However, after working together for a while, they became comfortable collaborating as a team, having already familiarized themselves with each other's strengths and weaknesses. This understanding demonstrated that it was vital especially during the simulation scenarios and debriefing sessions.

2.5 Students Perspectives on How to Improve Simulation-Based Education

Several students' perspectives on SBE can be retrieved from previous studies. In their study to explore simulation experiences for child and mental health nursing students' pre-registration, Felton et al. (2013) found that there are potential ways in which simulation could be further developed in the future. Enhancing SBE can be achieved by incorporating detailed, realistic scenarios that provide students with immersive and context-rich learning experiences. These comprehensive scenarios enable students to engage more deeply with the material, practice critical skills, and better understand complex concepts in a simulated

environment. Scenarios can include complex psychological or physical conditions that would necessitate additional work for the student. This approach is likely more appropriate to learners who have prior exposure to real clinical settings, as they are expected to possess a deeper level of knowledge compared to novices (Felton et al., 2013).

Furthermore, informing students about what to expect during simulation sessions can enhance their performance. Lesā et al. (2021) conducted a study with the aim of exploring the nursing students' learning experiences in simulation and propose ways to optimise learning in these environments. The study found that informing students about the learning objectives of simulation sessions well in advance is essential. Students' performance was found to improve when they were informed about the procedure well in advance because it allowed students to review and prepare. In the same vain, Bø et al. (2022) found that having the scenarios ahead of time was advantageous and reassuring as it allowed students to approach the simulation activity with more confidence and preparedness. However, this could probably be a challenge as it may put students in a danger of memorizing the entire procedure from the start to the end without considering any potential harm that may arise in the process.

Aebersold (2018) proposed other important educational strategies that can be used to enhance the effectiveness of simulation. One of those strategies is to incorporate SBE into the curriculum. The author emphasizes the importance of accurately planning and integrating simulations into the curriculum to enhance the learning experience and prevent the redundancy of performing the same procedures repeatedly. Careful execution ensures that simulations provide meaningful and varied learning opportunities, rather than becoming repetitious. A well-designed simulation should offer diverse scenarios and

realistic challenges that reflect real-world conditions. Without this careful attention, simulations can become ineffective and no more beneficial than traditional clinical teaching methods.

Faculty are encouraged to allow their students to practice beyond what and how they would if they were learning in a real clinical setting. Aebersold (2018) suggests that students should not always assume the role of student nurse, but should be given the opportunity to occasionally assume the role of bedside nurse, which includes making decisions, calling other healthcare providers, documenting without a co-signer, and administering medications independently. The author also claims that students can assess their performance levels during this experience while remaining within a safety net. To accomplish this, it is critical to establish ground rules during the pre-brief period so that students understand what is expected of them.

2.6 Summary

Studies show varying experiences, benefits, challenges and perspectives that students have in SBE in general and in its various phases. Briefing phase of SBE provides learners with the learning objectives for that particular simulation, orienting them to the equipment and assigning roles to the learners. Studies show that, if scenarios and learning objectives are shared prior to the SBE, learners' performance increases. Simulation scenario phase is the time in which the simulation activity is taking place and learners act out the scenario. Various feelings ranging from good feelings to bad feelings are reported. The debriefing phase is the final one in which a constructive discussion regarding the whole simulation is taking place. Studies demonstrate that this is the critical time in which learning is taking place and important corrections are given in a constructive way. Several

benefits for SBE are reported including increasing learners' knowledge, clinical competence, self-confidence, enabling students to work in a team among others. Few challenges have been also reported including insufficient time to practice in the simulation lab, limited resources for learning, lack of authenticity for the simulation, working with people of different personalities among others. Studies also show that SBE is a very important approach for learning, however, it could be improved by integrating it in curriculum, adding more time for learning, including learning of complex skills among others.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the study. Details on the study design; study setting; study time; study population; inclusion and exclusion criteria, sampling method; data collection method; data collection tools; pretesting of the data collection tool; data management; data analysis; trustworthiness and ethical considerations are presented in this chapter. Each section is described independently, with justifications provided as needed.

3.2 Study Design and its Philosophical underpinnings

This study used an exploratory-descriptive qualitative (EDQ) study design to explore perceptions of nursing and midwifery students on SBE. The qualitative approach was selected because the researcher wanted to explore the depth, richness and complexity of the phenomenon under study from the view point of people experiencing it (Gray et al., 2017). Exploratory-descriptive qualitative design is a study design in healthcare practice that offers an in-depth, multi-dimensional approach, making it valuable for exploring areas that have been previously overlooked or underexplored (Hunter, 2019). Exploratory-descriptive qualitative design was used because it seeks to examine or explore and describe participants' experiences and perspectives in relation to the phenomena being studied.

Philosophical perspectives dictate what constitutes knowledge and how the phenomena of interest should be studied. This study is based on a constructivism ontological stance. This assumption suggests that reality is constructed through social interactions (Blaikie., 2000). As such, students' individual perceptions towards SBE are

seen to be formed by their interaction with teachers, fellow students and the learning environment. Furthermore, epistemologically, the study is grounded in an interpretivism perspective. This is the belief that the social world is the world interpreted and experienced by its members from the 'inside'. It emphasizes the importance of understanding and interpreting the meanings that individuals ascribe to their experiences and actions. Interpretivists argue that reality is socially constructed and that individuals interpret the world based on their unique experiences, beliefs, and cultural backgrounds (Blaikie., 2000). In this context the assumption is that the researcher can understand and interpret students' perceptions by engaging with their descriptions, feelings and interpretations.

3.3 Study Setting

This study was conducted at Haydom Institute of Health Sciences (HIHS) located in Manyara region, Northern Tanzania. HIHS is a private tertiary institution which belongs to the Evangelical Lutheran Church of Tanzania (ELCT) Mbulu Diocese. It is located 80 km away from Babati town which is the head quarter of Manyara region. HIHS is a middle college offering diploma in nursing and midwifery, clinical medicine and medical laboratory sciences. The institution complies with Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) guidelines to perform a Competence Based Educational Training (CBET) curriculum for national technical award (NTA) level 4-6 to all programmes which has been approved by National Council for Technical Education (NACTE).

In Tanzania, NACTE has set the NTA levels in which appropriate and competencies are described for each level and each programme. The levels start from national vocational training award (NVTA) level 1 to 3 then NTA level 4 to 10. NTA level

4 is the basic technician certificate, level 5 is the technician certificate, level 6 is the ordinary diploma, level 7 is the higher diploma, level 8 is the bachelor's degree, level 9 is the master's degree and level 10 is the doctor of philosophy. During the period of data collection, the college had a total number of 660 students in which 231 were pursuing diploma in nursing and midwifery from NTA level 4 to 6.

This setting was selected because SBE is being employed as a result of a Norwegian project that implements SBE in nursing and midwifery training institutions in low resource settings. According to Polit & Beck (2017), the first step in qualitative sampling is to identify a setting with high potential for information richness. As a result, HIHs was chosen because it had sufficient information that could be used to address the aim of the study.

3.4 Study Population

The study population were third-year diploma (NTA level 6) in nursing and midwifery students from HIHS both in-service and pre-service students. In-service students are those who are upgrading their qualifications, having previously obtained nursing certificates and worked as enrolled nurses. In contrast, pre-service students are those who have not yet worked as nurses as such they are fresh from secondary school. During data collection, the class had a total number of 97 students in which 88 were pre-service and 9 students were pre-service. This study population was selected due to their substantial experience with SBE. The researcher believed that third-year (NTA level 6) students, having engaged with SBE from their first (NTA level 4) through third years (NTA level 6), possessed more experience compared to first- and second-year students.

3.5 Inclusion Criteria

The study included third-year diploma in nursing and midwifery students from HIHS who had been exposed, had experience with SBE and who were willing to participate.

3.6 Exclusion Criteria

Third-year nursing and midwifery students under the age of 18 were considered minors and were not included in the study. Furthermore, students who were absent during the data collection period or unable to participate due to health conditions were excluded.

3.7 Sample Size and Sampling Method

The researcher initially planned to conduct five focus group discussions (FDGs), each with 6 participants, making a total of 30 participants. However, during data collection, four of the focus groups had 6 participants each, while one group had 7 participants, resulting in a total of 31 participants.

A purposive sampling technique was used to select participants. This is the method of selecting samples where the researcher deliberately selects the cases or types of cases that will contribute the most to the study. It is an intentional selection of participants who are rich in information and can enhance researcher's understanding to the phenomenon (Polit & Beck, 2017). Purposive sampling technique was chosen because it helped the researcher to identify individuals who could best address phenomenon under study.

The researcher after receiving the ethical clearance from COMREC and from KCMU CRERC as well as an acceptance letter from the principal of the college, was directed to the deputy principal in academics and research who directed the researcher to the teacher on duty. The teacher on duty for that week who was also the academic teacher

for nursing department, assisted the researcher to gather third-year nursing and midwifery students. Unfortunately, because it was an examination week, only 13 students showed up. The researcher provided verbal information about the study and screened for inclusion criteria by asking if they have all been exposed to SBE. The whole group of 13 students met the inclusion criteria and were recruited for the study. Two focus groups were formed in which one had 7 participants and the other had 6 participants.

On the second day, the researcher was linked with more students. Those who met the inclusion criteria were recruited for the study and three focus groups were formed with 6 participants each.

3.8 Data Collection Method

The study employed FGD during data collection. According to Burns & Grove (2013) focus groups offer a sense of safety to participants to those who are anxious as it gives freedom to express ideas, emotions and behaviors honestly in a homogeneous group. Also, one of the assumptions underlying FGD is that the facilitator can help participants recover information that might have been forgotten by making the interview focused (Burns & Grove, 2013).

3.9 Data Collection Process

The researcher began the data collection process by assigning participants to focus groups as well as planning for the appropriate time and location for the meetings. The whole process of data collection was done in a period of two days. All five FGD were conducted in the same room within the college premises. Two FGD were conducted in the first day and the other three in the second day. Every participant was given equal chance

and sufficient time to speak their viewpoints regarding the questions asked. All five focus groups conducted their discussions within an average 38 minutes.

The researcher used FGD guide with a list of open-ended questions to narrow the conversation to the specific phenomenon being studied. The discussions in the focus groups were conducted both in English and Kiswahili in order to allow participants to explain their view points or opinions in a language that is convenient for them and express terminologies the way they understood them better. All information provided by participants were audiotaped to ensure accuracy and allow for transcription.

Data saturation was reached during the fourth group, indicating that no new insights were emerging from the discussions. However, the researcher continued to the fifth group to confirm the saturation. According to Burns & Grove (2013), data saturation occurs when additional sampling simply confirms previously obtained data, resulting in redundancy and no new information being gathered.

3.10 Data Collection Tool

Data collection was conducted using a focus group discussion guide, see Appendix 1 English and 2, Kiswahili). The questions in the FGD guide were open-ended to allow participants to express their points of view based on the question asked. The researcher also used follow-up questions or probes to allow participants to elaborate further.

The questions in the focus group discussion guide were created by the researcher in alignment with the specific objectives of the study. Following the development of these questions, the researcher sought validation from experts in qualitative research and SBE to ensure the tool effectively addressed the objectives of the study.

The questions were grouped into demographic information which were age, sex and whether in-service or pre-service. Other questions were framed in accordance with the specific objectives of the study which were experiences, perceived benefits, perceived challenges and perspectives on improving SBE.

3.11 Pretesting of Focus Group Discussion Guide

The data collection tool for the FGD went through pretesting. The first FGD which lasted 36 minutes served the purpose of pretesting. Since no adjustments were needed after the initial FGD, the researcher deemed the questions in the FGD guide clear and understandable. Consequently, the first FGD was counted among the total FGDs conducted, and its information was incorporated into the analysis.

3.12 Data Management

Data from focus groups were audiotaped, transcribed and translated to English by a professional translator with expertise in both English and Kiswahili. Every transcript had participants' descriptions labeled with an identification number different from any participant's personal identifiable identity. To ensure consistency of the translated transcripts, the researcher listened to the audio to check for the accuracy of the transcripts and for variability in transcription and translation. The audio, transcripts and the translations were kept in the researcher's computer with a password only known to the researcher.

3.13 Data Analysis

Data analysis was carried out using thematic analysis (Braun & Clarke, 2006). The process of thematic analysis involved constant moving back-and-forth between the entire data set, the coded extracts of data being analysed and the analysis of the data being produced. The researcher followed all the six phases of thematic analysis according to Braun & Clarke (2006).

The phases for thematic analysis are: -

(1) Familiarizing yourself with your data. In this phase, the researcher read and re-read the transcripts to be immersed and become familiar of the depth and breadth of the data. The researcher read the transcripts repeatedly in an active way searching for meanings and patterns.

(2) Generating initial codes. After reading the entire content, becoming familiar with it, and coming up with a preliminary list of concepts and interesting data points, the researcher generated codes. In this study, codes were generated depending on the data and themes were drawn from the data and not theory-driven. The process of generating codes was done with the help of NVivo 12 software. Example of codes created were: Facilitates understanding; Gaining knowledge; Knowing what to do; Gaining skills; Gaining experience

(3) Searching for themes. After the researcher has coded all the data, the various codes were sorted into potential themes. All pertinent coded data extracts from identified themes were compiled. At this point, the researcher also began to consider the relationship between

codes, themes, and different levels of themes by grouping similar codes together and merging those with the same meaning

(4) Reviewing themes. In this phase, the researcher reviewed themes that were already formed. Themes that appeared to be similar were merged and those with diverse information were separated. It was at this stage that the researcher checked the data and extracts in each theme to make sure they stick together meaningfully and making sure that there is a clear distinction between them.

(5) Defining and naming themes. At this point, the researcher identified the essence of what each theme was about and determined the aspect of data that each theme captured. Additionally, the researcher created subthemes for each theme and assigned a name based on the information provided. An example of one theme on how it emerged from quotes is given in Table 1.

(6) Producing the report. Finally, the researcher produced a report. The researcher provided adequate evidence of the themes within the data in order to complete the analysis and produce a report of the data that is succinct, coherent, logical, non-repetitive, and interesting. This was accomplished by selecting particularly illustrative examples or passages that captured the essence of the point that is was made.

Table 1: Example of an emerging theme from quotes.

QUOTE	CODES	SUB-THEME	THEME
So, this simulation here significantly facilitates the understanding on the ground (FGD I, Pt 3)	Facilitates understanding	Enhancement of skills and knowledge acquisition	Perceived Benefits of Simulation-Based Education Among Nursing Students
We gain knowledge, practice dealing with retained placenta, postpartum hemorrhage (PPH), and calling for help. We leave with solid knowledge, and when we go to the actual setting, we perform well (FGD III, Pt 6)	Gaining knowledge		
The advantage of being taught through simulation is that you gain direct knowledge (FGD V, Pt 6)			
it helps you know what you are doing. Memorizing from books is one thing, but if I haven't done it practically, if an emergency happens, I might wish to read first before doing it. But if I have done it with my hands, I have at least the knowledge to solve the problem (FGD III, Pt 2)	Knowing what to do		
We practice to gain skills. So, when you go to the ward, for example, you know what you are doing there because you practiced on the mannequin (FGD I, Pt 2)	Gaining skills		
it enhances our skills as students because you get to do something practically, although you do it on a mannequin, but then you go and do it on a patient (FGD 2, Pt 6)			
Therefore, when we go to work with patients, we have extensive skills because we have practiced by doing and observing others first, and then we practice on real patients … through simulation, we learn various skills to manage conditions and perform different tasks. So, we learn, and later, it helps us apply that knowledge in real situations (FGD V, Pt 6)			
Another advantage is gaining experience… regarding increasing experience, for example, there's a procedure we did, manual removal of the placenta, we did it in the second year and practiced it in the third year in the skill lab. Now, when you encounter it, you have the experience of how it's done, and you won't make mistakes (FGD I, Pt 7)	Gaining experience		

Table 1: Example of an emerging theme from quotes continued

QUOTE	CODES	SUB-THEME	THEME
simulation helps us a lot when we go to practical areas. It boosts our memory for procedures or conditions, as we've learned them theoretically. So, when we practice simulation, it helps us remember how a particular procedure is done and the critical steps to follow to assist the patient (FGD IV, Pt 5)	Boosts memory Critical steps to be followed	Boosts Students' Memory on Steps of Various Procedures	
You will learn, and you will remember. If your colleague did something on that day, you will remember that on that day, he did this and this to help a patient with a certain condition quickly. So, it helps us a lot (FGD IV, Pt 1)	Helps to remember what a colleague did		
When you go to a real patient, you remember that you did what in the skill lab, how you positioned the mannequin, and how you can position the actual patient. So, you can easily remember (FGD IV, Pt 4)	Helps remember what you did		
So, due to the simulation you have done, you will remember all the things needed at that moment. But if you have never participated in any simulation and have never seen how that procedure is done, you won't be able to help (FGD IV, Pt 1)	Helps remember all the things		
One benefit that I have gained from this method of learning through acting realistically is that it's easier to remember. When you learn, you see your peers acting, but for you, it's easy to remember to do something quickly (FGD II, Pt 5)			
So, due to the simulation you have done, you will remember all the things needed at that moment. But if you have never participated in any simulation and have never seen how that procedure is done, you won't be able to help (FGD IV, Pt 1)			
when we act out real-life situations, you have a broader field to try many times compared to dealing with a patient. For instance, in a breech delivery, you can reposition the baby as many times as you want, and there is no time limit. If it needs to be done in 5 or 10 minutes, you can set your own time, maybe do it for half an hour or 40 or 50 minutes (FGD I, Pt 7)	Try many times Set your own time	Enhancement of Patients' Safety	

Table 1: Example of an emerging theme from quotes continued

QUOTE	CODES	SUB-THEME	THEME
Simulation helps us improve the quality of services we provide to real patients. For example, if we learned in the skill lab how to maintain sterility, when we get to the patients, we will maintain the same standards because we will have recorded it in our memory, reducing the risk of patients getting infections (FGD IV, Pt 3)	Improve quality of the services		
Resuscitation is not something you can rush on a patient; you might end up causing harm. But practicing on a mannequin helps you know the proper position and side during resuscitation (FGD I, Pt 3)			
When we learn here in the skills lab, we start with mannequins, observing the teacher first. So, you observe, and then you practice. If we make a mistake, the teacher corrects us to ensure that when we go to work with real patients, we don't harm them (FGD V, Pt 3)	Reduce harm to patients		
Simulation also helps with repetition … the purpose of doing a repeat is that you can go back to the skill lab to practice a situation like that. So, any day you encounter it again, you can manage it easily (FGD I, Pt 3).	Enables repetition		
In simulation, we also gain confidence. For instance, when we first encountered models, it seemed unusual. However, as we practiced more, our confidence increased. This confidence helps us when we encounter real patients; we are not afraid because we have already done it on models (FGD IV, Pt 2).	Boosts confidence	Boosts students' confidence in performing various procedures	
It also helps immediately with confidence. For instance, if you come across someone who is bleeding, instead of being shaky, you go and help without hesitation because you have no fear as you know how to handle the situation (FGD I, Pt 1)	Reduce hesitation		
It enables us so that even when we get to the patients, we are not afraid because we have practiced. Although it is not real here, we have learned with models, but when we get down there (clinical area), we practice, and it helps us not to be afraid of what we are doing (FGD II, Pt 2).	Reduce fear		

3.14 Trustworthiness

Trustworthiness or rigor is used to describe the level of confidence in the data, interpretation, and methods used to ensure the study is of a good quality (Polit & Beck, 2017). In order to ensure the study is considered worthy by readers, the researcher applied various criteria as suggested by Lincoln & Guba (1985). These criteria are credibility, dependability, confirmability and transferability.

3.14.1 Credibility

According to Polit & Beck (2017) the most crucial criterion is the study's credibility, or the level of trust or confidence in its validity and consequently its findings. Some of the strategies the researcher applied to promote credibility according to Lincoln & Guba (1985) are peer debriefing and member checking. For peer debriefing, the researcher sought the expertise of a qualified professional in qualitative research who was not associated with the study. This external expert reviewed the study's methodology, transcripts, and findings to provide an objective assessment. Their feedback helped ensure the rigor and credibility of the research process and findings. For member checking the researcher collaborated with respondents to verify or ensure the accuracy of the data gathered. Finally, the report was sent to a few participants to verify that it accurately reflected their intended meanings during data collection.

Furthermore, in order to increase credibility, the researcher included excerpts in the findings chapter. Verbatim quotes give readers a deeper level of understanding, provide proof for the interpretations pointed out, and allow readers to make judgments regarding the fairness and veracity of the analysis (Corden & Sainsbury, 2006).

3.14.2 Transferability

Transferability refers the degree to which findings are applicable to people in other contexts (Polit & Beck, 2017). According to Lincoln & Guba (1985), it is not the researcher's responsibility to establish a measure of transferability. The researcher's role is to supply the data base that allows future applicants to make a transferability judgment. In this study, the researcher ensured transferability by giving thick description on inclusion and exclusion criteria, methods of data collection, and context where data was collected. Also, the researcher carefully analysed the data, produced a report and discussed findings of the study comparing it with other similar studies.

3.14.3 Dependability

Dependability is the stability or consistency of the data over time and across conditions of the study (Polit & Beck, 2017). To ensure consistency, the researcher documented all steps from the start of the project through the reporting of findings. All changes that occurred in the course of the study were properly documented. Dependability was also enhanced by giving detailed descriptions on data collection methods and analysis. The researcher conducted data collection using the same data collection tool for all five focus groups. Transcription and translation were then done. The researcher read and listened to the audio to ensure all the information is transcribed correctly. Furthermore, the researcher, in collaboration with another individual, independently developed themes using thematic analysis as described by Braun & Clarke (2019). After completing their individual analyses, they assembled to discuss their findings and reach a consensus on the themes and subthemes to be included in the final report. This collaborative review ensured that the thematic analysis was comprehensive and accurately reflected the data.

3.14.4 Confirmability

Confirmability is the neutrality or the degree that the findings are reliable or consistent and repeatable (Polit & Beck, 2017). This was accomplished by recording every word said by participants and the researcher in order to distinguish the interviewer's perspective from the participant's information. Furthermore, the researcher had an audit trail in order to help interpret the participant's response. Notes on participant behavior during data collection were recorded in a field journal.

Furthermore, investigator triangulation was used to increase confirmability in this study. According to Carter et al. (2014) investigator triangulation includes multiple researchers participating in a study to produce diverse observations and conclusions. In this study, data analysis was carried out by two separate individuals, one of whom is the researcher. They conducted data analysis to create themes and subthemes. Following each individual's work, they discussed and decided what themes and subthemes to include in the report.

3.15 Ethical Consideration

Research proposal for this study was reviewed and approved by Research and Ethical Review Committee of Kilimanjaro Christian Medical University College (CRERC) with approval number PG124/2023 (Appendix 4) and College of Medicine Research and Ethics Committee (COMREC) with approval number P.08/23-0236 (Appendix 5). Furthermore, permission letter to conduct this study was granted by the principal of Haydom Institute of Health Sciences (Appendix 7).

Participants' human rights emphasis was on the right to self-determination, privacy, anonymity, confidentiality, fair treatment, and protection from harm. This was

accomplished by providing participants with complete and detailed study information (Appendix 3 in English and 4 in Kiswahili). The information sheet included details about the study's purpose, interview duration, and the potential benefits and risks of participating in the study.

In addition, participants were asked to grant permission to the researcher to use a digital sound recorder during interviews. All participants were given the guarantee that their information would be handled with the utmost confidentiality. The participants' individual identities were not used and the final report used only codes instead of participants' identifiable personal identity or names. To ensure autonomy, emphasis was put on their freedom to participate or withdraw at any time, or to end an interview without any penalty whenever they felt it was necessary. Only those who agreed to participate in the study were asked to sign the consent form (Appendix 5 in English and 6 in Kiswahili).

CHAPTER 4: PRESENTATION OF FINDINGS

This chapter presents findings of a study which had an aim of exploring the perceptions of nursing and midwifery students on simulation-based education at Haydom Institute of Health Sciences in Northern Tanzania. These findings are presented in two sections which are demographic characteristics and qualitative findings. Qualitative findings are presented as themes and sub-themes. Each sub-theme will describe specific findings in that area and verbatim excerpts will be supplied to support it.

4.1 Demographic Characteristics

The study had a total number of 31 participants. Five FGDs were formed with 4 groups having a total of 6 participants and 1 group having 7. All participants were third year diploma in nursing and midwifery students both male and female. Majority 64.5% (20/31) of participants were female. The minimum age was 21 years while the maximum was 40 years. More than 80% (25/31) of participants had the age range of 21 to 25. The huge difference in age was contributed to by the fact that some students were in-service. More than three quarter (26/31) of all the participants were pre-service which are the majority in the class.

4.2 Qualitative Findings

The analysis of qualitative data resulted into 4 themes and 13 sub-themes. Every theme is presented independently along with its sub-themes. Table 2 shows the summary of themes sub-themes for each theme.

Table 2: Summary of themes and subthemes

Sub-themes	Themes
Students' learning experience during simulation	General experience of simulation-based education among the nursing students
Students' learning experience of complex procedures during simulation.	
Students' experience of the joint simulation with hospital staff	
Enhancement of knowledge and skills acquisition	Perceived benefits of simulation-based education among the nursing students
Boosts students' memory on steps of various procedures	
Enhancement of patients' safety	
Boosts students' confidence in performing various procedures	
Limited resources	Perceived challenges faced by nursing students during simulation-based education
Facilitators' negative attitudes	
Large number of students	
Limited time for simulation	
Advocating for increased resources	Perspectives on how to improve simulation-based education
Suggestions regarding the actual conduct of simulation activities	

4.2.1 General Experience of Simulation-Based Education among the Nursing Students

Participants were asked to describe their experience in learning through simulation. Their response revealed that they have been learning through simulation since their enrollment at the institution. Several experiences especially on simulating various clinical procedures were also reported. Findings in this theme are presented under the following sub-themes: students' learning experience during simulation, students' experience on the duration of simulation-based education, Students' learning experience of complex procedures during simulation and students' experience of the joint simulation with hospital staff.

4.2.1.1 Students' Learning Experience during Simulation

The study revealed that SBE provided a multifaceted learning experience that was instrumental in developing students' clinical skills and confidence. Participants reported that through simulations, students were able to observe a variety of clinical procedures and techniques in a controlled environment. The visual and hands-on exposure to various clinical procedures allowed students to understand critical steps involved and the rationale behind every procedure. This real-time observation helped students recognize best practices, reinforcing their learning through visual and practical examples. The skills and techniques practiced in simulations were directly applicable to real patient care. The familiarity gained from simulations helped students transition smoothly from practice to actual clinical settings. In these settings, they could apply their learned skills with greater confidence and competence. Few participants said:

When we are in the actual simulation, we learn by observing. For example, if a certain condition requires quick management, you can call for help immediately, and they will come and assist you quickly so that the patient can be helped quickly. So, we learn by seeing. Also, in actual simulation, you can learn more than just observing. You will learn, and you will remember (FGD IV, Pt 1)

… You gain direct knowledge. You see with your eyes how things are done, and then you can practice before encountering real patients. So, when we learn through simulation, we observe directly what is happening. Therefore, when we go to work with patients, we have extensive skills because we have practiced by doing and observing others first, and then we practice on real patients (FGD V, Pt 6)

My experience is that we first learn here with models, so when we learn there, we assume it's like dealing with real patients. When we leave here, it's like we gain experience here and then apply it to real people (FGD II, Pt 5)

Participants also reported that the educational journey from initially having fears to mastery was profoundly shaped by learning through observing and participating in simulations.

For me, it allows self-improvement. For instance, when I was a first-year student, I used to tremble a lot when transitioning from the skills lab or simulation to the real clinical setting. However, as I progressed and took exams, I saw myself improving. … We take exams, and then we go down to the clinical setting. So, we practice…. (FGD V Pt 5)

If you look at the experience from when we entered the first year until now, when we first arrived in the first year, there were some procedures we were afraid of, and we forgot some things. But now we have gained experience through performing these realistic simulations … (FGD IV, Pt 3)

4.2.1.2 Students' Learning Experience of Complex Procedures during Simulation

The study found that in the skills lab various complex procedures and skills are performed during SBE. Procedures such manual removal of the placenta, insertion of an intravenous cannula, insertion of male urinary catheter, administration of intravenous fluids are performed during SBE. Most of these procedures can be performed in a skills lab with low fidelity mannequins with no requirement of advanced computerized models. These simple models are also used to teach complex procedures like delivery of the baby, neonatal or newborn resuscitation which participants reported that, without first practicing on mannequins, it can be difficult for a student to manage such a condition in the real clinical environment. Some procedures that are common in the ward are performed regularly or repeatedly in the skills lab to enable students to get used to them and be ready to manage them anytime they may be needed to do so. Some of the common procedures reported are management of postpartum hemorrhage and neonatal resuscitation. One participant reported:

Many different procedures are simulated. Examples of procedures that are frequently simulated include postpartum hemorrhage, neonatal resuscitation, and various others… (FGD V, Pt 6).

Another participant added that most often complex procedures (procedures that can easily complicate life and if not managed promptly can cause death) are simulated.

When we do those simulations, we often choose serious procedures so that everyone knows and is capable. In case of an emergency, everyone is responsible and not feel overwhelmed. For example, here we often do PPH management simulations regularly so that many staff members are familiar with it in case it happens. PPH problems often occur, so we try to show simulations for everyone to know (FGD III, Pt 2)

Many other procedures are performed in the skills lab depending on what is intended to be learned in that particular simulation. The knowledge and skills gained in performed procedures on models or mannequins is applied to the real clinical environment. On this, one participant said:

We perform various procedures ..... such as the manual removal of the placenta. We mostly use models, but when it happens, because we frequently participate in the workplace (real clinical area), we review what we have done based on how our instructors supervised us (FGD III, Pt 4)

4.2.1.3 Students' Experience of Joint Simulation with Hospital Staff

The study revealed the existence of a joint simulation practice in which college students together with staff in their teaching hospital performed various procedures collaboratively. One participant said "*When we go to the ward, there is also a hospital simulation" (FGD IV, Pt 6).* Participants reported that the joint simulation usually took place occasionally either once or twice a week after the morning report especially in maternity department. In that particular simulation, both students and hospital staff are given roles to play. Procedures such as management of PPH, second stage of labour among other procedures are usually simulated as described by one participant:

Down there, the priority is on real situations with actual patients. However, occasionally, for example, during a period in the labour ward, we went to do a simulation. So, it happens occasionally, maybe for a specific event (FGD V, Pt 5)

The experience described highlights the collaborative nature of learning in a clinical environment. Occasionally after a morning report, hospital staff and students gather for a simulation session. During this time, hospital staff demonstrate various procedures, allowing students to observe and participate actively. This setup creates an immersive learning experience. The staff might perform critical tasks while explaining their actions and thought processes. This hands-on approach reinforces theoretical knowledge and practical skills in real-time. One participant said

Even us, it means that when we are at the hospital, the staff performs procedures for all of us. After the morning briefing, we are called together, and they do the simulation (FGD III, Pt 2)

On the designated Thursdays, participants gather in the sala room, which is also used for morning reports. This gathering serves as a platform for everyone to observe and participate in simulation activities. The weekly simulations represent a significant opportunity for practical learning, bridging the gap between academic instruction and clinical practice. This collaboration between the college and hospital fosters an enriching educational environment, preparing participants for future challenges in the healthcare field. One participant said:

on Thursdays of that week, we do simulations there. It's like two institutions, a hospital, and a college; we all gather there to listen... so the participants have

already prepared what they are going to do there… the college and the hospital collaborate to perform a specific procedure in the sala room [a room where the morning report is done] (FGD II, Pt 2).

The joint simulation provided students with the chance to receive direct, hands-on supervision from experienced mentors during that particular learning process. This close guidance allows students to refine their skills and techniques with immediate feedback and support from mentors. One participant said:

At the maternity ward, we participated in a simulation of a delivery. We were assistants, and we were being supervised by the mentors (FGD IV, Pt 1)

4.2.2 Perceived Benefits of Simulation-Based Education Among Nursing Students

Participants were asked to describe what they perceived as benefits of simulation-based education and the findings showed that simulation improved their knowledge and skills making them ready for actual patients' care. The findings in this theme are presented in five sub-themes which are enhancement of knowledge acquisition, enhanced acquisition of skills, boosts students' memory on steps of various procedures, enhancement of patients' safety and boosts students' confidence in performing various procedures.

4.2.2.1 Enhancement of Knowledge and Skills Acquisition

The study found that simulations enhanced students' understanding of procedures more effectively than traditional textbook learning. This hands-on approach allowed for a deeper understanding and practical application of the material. They added that reading books was very important however, it was not sufficient especially when it comes to learning of skills. Participants thought that the understanding was enhanced through hands-

on practice. Performing different procedures in the skills lab could make students have what they called *"a solid knowledge"* that could help when the procedure is to be performed in clinical area. This is illustrated by the following excerpts:

> *So, this simulation here significantly facilitates the understanding on the ground (FGD I, Pt 3).*
>
> *... you do the procedure practically, it helps you know what you are doing. Memorizing from books is one thing, but if I haven't done it practically, if an emergency happens, I might wish to read first before doing it. But if I have done it with my hands, I have at least the knowledge to solve the problem (FGD III, Pt 2).*
>
> *The practical activities we do here in the skills lab help us because they enhance our knowledge…. We gain knowledge, practice dealing with retained placenta, postpartum hemorrhage (PPH), and calling for help. We leave with solid knowledge, and when we go to the actual setting, we perform well (FGD III, Pt 6).*

It was also found that simulation helped in enhancing students' ability to perform procedures correctly in real patients' care. When the procedure is performed in the skills lab, although it is on the mannequin, students described that it enabled them to know how the procedure is done practically and that is very helpful in actual patients' care. Some of the descriptions given with regards to improving skills are as follows:

> *We practice to gain skills. So, when you go to the ward, for example, you know what you are doing there because you practiced on the mannequin (FGD I, Pt 2)*

... it enhances our skills as students because you get to do something practically, although you do it on a mannequin, but then you go and do it on a patient (FGD 2, Pt 6

Participants also described that simulations helped them gain experience with which a similar procedure in the actual patients' care would not be regarded as the first attempt. The process of improving skills and gaining experience was described as from first observing then practicing with a student's own hands and finally use the skills learned to provide care to real patients. Procedures such as manoeuvers for delivery of breech and manual removal of the placenta were mentioned as some of the procedures that require a lot of skills that could be learned through simulations as illustrated:

... regarding increasing experience, for example, there's a procedure we did, manual removal of the placenta, we did it in the second year and practiced it in the third year in the skill lab. Now, when you encounter it, you have the experience of how it's done ... (FGD I, Pt 7)

The experience we gain, for example, learning to deliver a baby with a breech presentation, we are taught manoeuvers and gain practical experience. Even when we encounter a real patient, we can help them based on the skills we learned through simulating how to deliver a baby with a breech presentation (FGD III, Pt 5)

Participants also added that the hands-on experience gained through simulations allowed them to perform procedures with a level of proficiently just like experts. This

practical exposure provided valuable insights and skills that could be used in performing complex procedures as illustrated:

> *... besides gaining experience, we become like experts. So, I practice through simulations, and when I go to a patient, I perform as required (FGD III, Pt 3).*

4.2.2.2 Boosts Students' Memory on Steps of Various Procedures

The findings of this study show that simulation helped in boosting students' memory of steps used in performing various procedures. When procedures and skills are learned in the skills lab through simulation, it helps students to know not only how a certain procedure is done in general but the critical steps to be followed in that particular procedure. Participants added that simulations helped students in retaining steps for various procedures by creating a vivid mental image of how each procedure is performed. This mental image enhanced their ability to recall and apply during execution of procedures in the actual clinical setting. The mental picture was developed through participating and observing others performing procedures in the skills lab during simulations. One participant said:

> *It [simulation] boosts our memory for procedures or conditions, as we've learned them theoretically. So, when we practice simulation, it helps us remember how a particular procedure is done and the critical steps to follow to assist the patient (FGD IV, Pt 5)*

Another participant went on to add:

You will learn, and you will remember. If your colleague did something on that day, you will remember that on that day, he did this and this to help a patient with a certain condition quickly (FGD IV, Pt 1).

The study also revealed that it is nearly impossible for students to perform a procedure accurately in actual patient care if they have not participated or watched the procedure being performed in the skills lab. When students observe how their peers perform procedures during simulations, it aids their memory. Two participants described it this way:

One benefit that I have gained from this method of learning through acting realistically is that it's easier to remember. When you learn, you see your peers acting, but for you, it's easy to remember to do something quickly (FGD II, Pt 5)

So, due to the simulation you have done, you will remember all the things needed at that moment. But if you have never participated in any simulation and have never seen how that procedure is done, you won't be able to help (FGD IV, Pt 1)

4.2.2.3 Enhancement of Patients' Safety

The study found that simulations are effective in enhancing safety to patients. Performing procedures in the skills lab through simulations, healthcare students enhance the quality of care they provide to patients. This practice ultimately reduces the risk of harm to patients. Ensuring patient safety depends on students knowing exactly what actions to take, when to take them, how to perform them, and why they are necessary. One participant gave an example of maintaining aseptic techniques when performing procedures by saying:

Simulation helps us improve the quality of services we provide to real patients. For example, if we learned in the skill lab how to maintain sterility, when we get to the patients, we will maintain the same standards because we will have recorded it in our memory, reducing the risk of patients getting infections (FGD IV, Pt 3)

Another participant added by giving an example of performing resuscitation by saying:

Resuscitation is not something you can rush on a patient; you might end up causing harm. But practicing on a mannequin helps you know the proper position and side during resuscitation (FGD I, Pt 3)

Mistakes and errors can be minimized also through constructive discussions happening in the debriefing phase of simulation. This reflective process helps identify and correct issues, reinforce what is done correctly and ensure students transfer the correct skills and information to the clinical area. During debriefing phase, participants received feedback from fellow students on areas for improvement and corrections, and they also benefited from the facilitator's guidance. The facilitator, who is the teacher, helped address and correct mistakes and errors that could potentially harm patients. On participant said:

When we learn here in the skills lab, we start with mannequins, observing the teacher first. So, you observe, and then you practice. If we make a mistake, the teacher corrects us to ensure that when we go to work with real patients, we don't harm them (FGD V, Pt 3)

Another way of reducing mistakes and errors reported in this study was repeating the procedures during simulation. Participants described that simulation offers a chance to repeat the procedure as many times as possible without causing any harm because it is done

in a safe environment. A student can repeat the procedure for as long as it takes for him/her to know how to perform it correctly. Repeating the procedures in the skills lab helps to reduce chances of making mistakes during the actual clinical practice. Two participants described it this way:

> *When we act out real-life situations, you have a broader field to try many times compared to dealing with a patient. For instance, in a breech delivery, you can reposition the baby as many times as you want, and there is no time limit (FGD I, Pt 7).*

> *Simulation also helps with repetition … the purpose of doing a repeat is that you can go back to the skill lab to practice a situation like that. So, any day you encounter it again, you can manage it easily (FGD I, Pt 3).*

4.2.2.4 Boosts Students' Confidence in Performing Various Procedures

The study revealed that simulations significantly enhance students' confidence in performing procedures during real patient care. Practicing these procedures in a skills lab allows students to become familiar with the techniques and processes, reducing uncertainty and anxiety. This hands-on experience helps them overcome fear, which often stems from a lack of knowledge about how to perform the procedures effectively. When students engage in performance of procedures during simulation, they get enough knowledge and skills. Participants also noted that when they face similar situations in real clinical settings, they can act confidently and without fear, as they are familiar with the procedures and have practiced them previously. The following illustrations were given:

> *In simulation, we also gain confidence. For instance, when we first encountered models, it seemed unusual. However, as we practiced more, our confidence increased. This confidence helps us when we encounter real patients; we are not afraid because we have already done it on models (FGD IV, Pt 2).*

Another participant went on to add that without the simulation experience, fear during actual patient care is unavoidable. This is what the participant said:

> *It also helps immediately with confidence. For instance, if you come across a situation or a person in distress, if you haven't learned, you might start trembling instead of helping. So, we have learned that when someone is bleeding, instead of being shaky, you go and help without hesitation because you have no fear as you know how to handle the situation (FGD I, Pt 1)*

More descriptions were given that although simulation is not practiced in the actual environment, it helps learners to overcome fear when they are exposed to actual environment. This is what the participant said:

> *It enables us so that even when we get to the patients, we are not afraid because we have practiced. Although it is not real here, we have learned with models, but when we get down there (clinical area), we practice, and it helps us not to be afraid of what we are doing (FGD II, Pt 2).*

In addition to boosting students' confidence in performing procedures on real patients, the study highlighted some limitations of simulation in terms of authenticity. Participants noted that mannequins and models used in simulations cannot communicate or express emotions, which can affect the realism of the practice. This lack of authentic feedback limits the

students' ability to fully prepare for the emotional and communicative aspects of patient care. One participant stated

> *One major challenge for us as we learn is that we practice with mannequins, making it difficult to communicate because you treat the mannequin as if it's a patient. So, it becomes challenging to communicate when the mannequin doesn't respond (FGD II, Pt 2)*

Despite the fact that simulation boosts confidence, participants also reported feelings of fear and anxiety especially when students perform procedures in the presence of their teachers. The study revealed that often the worry is about whether students' actions align with what they were taught in the class which creates a fear of not meeting their expectations. This fear was particularly more intense during exams, where the pressure to impress the teacher lead to self-doubt and reduced performance. The concern that teachers might judge students' actions in performing procedures inadequately further exacerbated these feelings and impacted their confidence. One participant reported:

> *Another challenge we face is performing in front of the teacher who is instructing us. We feel a certain fear, a fear of whether what I'm doing is as he/she taught me. There is a fear of the teacher, and sometimes, in an exam, you might not perform well because you fear the teacher and feel like the teacher thinks you don't know anything, and you start doubting yourself due to that fear (FGD III, Pt 6)*

4.2.3 Challenges Faced by Nursing Students during Simulations

Participants were asked to describe what they perceived as challenges during simulation and their response showed that big number of students and limited resources

both human and non-human were some of the factors. Under this theme, four sub-themes emerged which are limited resources, facilitators' negative attitudes, large number of students and limited time for simulation.

4.2.3.1 Limited Resources

Findings of this study revealed limited resources as one of the challenges faced by students during simulations. Participants indicated that they required resources and equipment for the simulation in order to perform the procedures successfully. Together with mannequins and other models used for learning, participants reported that the skills lab was very small compared to the number of students. They also noted that only one building is expected to be used by all students across the three programmes at the college. One participant said:

> *...since the institution has various courses, at least we should have additional skill labs. Have at least two skill labs with sufficient equipment, because all four courses are required to use the skill lab. We shouldn't rely on just one skill lab; we should have at least two and more (FGD I, Pt 1)*

The shortage of resources was also reported to compromise the quality of practice. Some participants reported that sometimes they are forced to do aseptic procedures with clean gloves because of shortage of sterile gloves. This confuses them during examinations and sometimes in real clinical practice because of what they have kept in mind during learning. In addition, sometimes only few students could engage in hands-on performance of the procedures in the simulation lab because resources available could not be enough for everyone to practice. Two participants stated:

There are procedures that requires sterile gloves but during learning we use clean gloves. … you can confuse during examination. Instead of using sterile gloves, you find yourself using clean gloves because you have kept in your mind that in this procedure it like I used clean gloves which is not right (FGD II, Pt 5)

You may find that you go to the skills lab as a group but only one-person practice because of insufficient resources. Therefore, not everyone is able to practice, the rest of you just observe. Most of the time, the cause of this is insufficient resources (FGD II, Pt 4)

4.2.3.2 Facilitators' Negative Attitudes

In the focus group discussion, participants highlighted communication issues with supervisors as a significant challenge impacting their engagement with the skills lab. They expressed that the way facilitators convey instructions and feedback during simulations is sometimes intimidating and bringing about feelings of discouragement. The fear of negative or harsh communication from facilitators sometimes prevent students from actively participating in skills labs, as they may feel anxious or discouraged by the facilitators' manner of interaction. Furthermore, this negative communication style leads to poor attendance at skills labs. Students often feel threatened and disappointed, and the demeaning facilitator's attitudes make them feel incompetent, diminishing their motivation to participate in these sessions. One participant illustrated it this way:

Maybe on the issue of supervisor, sometimes we fear the way supervisors communicates "kauli". That can be a challenge. So sometimes, we don't go to skills lab because of the way the supervisor communicates (FGD II, Pt5).

Participants used the Swahili word "*kauli*" to describe the harsh tone or communication from some of the facilitators. *"Kauli"* is a Swahili word meaning "a statement". In this context, *"kauli"* refers to harshly spoken words that aim to discourage or demoralize someone, often undermining their confidence. Such communication can create a negative atmosphere that affects motivation and participation. Participants explained that sometimes the tone or choice of words used by facilitators is discouraging, making it difficult for students to approach them even when they need help. This, in turn, threatens the overall purpose of SBE as illustrated:

> *By "kauli," I mean the way the supervisor communicates. Sometimes, you go to the supervisor asking them that you want to learn something but the tone or words they use can be intimidating, and it becomes a challenge for us. So, we might hesitate to approach them due to their communication style (FGD II, Pt5).*

4.2.3.3 Large Number of Students

The study found that large number of students is among the major challenge that students face during SBE. Due to this overcrowding, students could not all fit into the skills lab together at once. To manage the situation, students were prearranged into groups of 25-30 students each. However, these group sizes were still too large for the limited space and resources available in the simulation lab. One participant said:

> *Ah, the challenge we face is that sometimes the students are too many. You may find that one group consists of around 25 or 30 students, and when you look at the space where we go, it's small (FGD V, Pt 2)*

Together with limited resources, huge number of students makes it difficult for every student to take part in the simulation and majority end up playing the role of observing. Much as observing is important, performing the procedure practically by hands is also very vital for learning as illustrated by one participant:

> *One of the challenges we face during simulation is that the number of people doing simulation is small. There are only a few people who are enough to perform a procedure, and not all of us will be able to practice (FGD IV, Pt 1)*

A larger group in the skills lab also makes it challenging for students to focus on the ongoing simulation activities. Eventually, it becomes easy for some students to become distracted or disengaged and some find themselves engaging in unrelated activities while others are actively participating in the simulation. Consequently, the overall effectiveness of the simulation is diminished. One participant said:

> *It's true when we say there are many factors, and sometimes only two people practice, while others are not serious; they sit at the back, and may start to chat (FGD V, Pt 6)*

4.2.3.4 Limited Time for Simulation

The issue of limited time for simulation was identified in two main areas: the overall time allocated for SBE and the time designated for each individual procedure within the simulation. First, the allocated time for SBE in the skills lab was considered by participant as inadequate given the number of procedures students needed to practice and the number of students who are supposed to access the simulation or skills lab. Participants noted that even when they tried to extend their practice time independently, they were often

unable to do so because the skills lab would be closed by the instructor most of the time during close of business each working day. Few participants stated:

> *You find that when we go to practice, we join a group, and you find that there are other classes there, either first-year or second-year classes. So, the time we go to practice is very short... And when we try to practice in our extra time, the teacher supervising has gone home, so it's closed. So, it becomes a challenge (FGD I, Pt 3)*

> *... there's a shortage of time because the time is limited, and there are many students who need to participate within that time. So, only a few people will have the chance to participate, and due to the limited time, others won't continue to learn (FGD V, Pt 6)*

Participants expressed that they had an experience of learning through SBE right from the first year. Since participants in the study were third year students, that was their third year of learning through SBE. However, participants raised a concern that only one week was allocated for SBE which was too short, limiting their ability to fully engage and practice. The brief timeframes did not allow for comprehensive exploration or mastery of the procedures. After completing the week of SBE, students transitioned to the clinical area, where they were given the opportunity to apply their skills and knowledge in real-world settings with actual patients as illustrated:

> *We are currently in the third year. Since the first year, we have been learning through simulation… So, we can say that we have been learning through simulation for the duration of these three years (FGD V, Pt 6)*

...there is a time for classroom studies and a time for going to clinical areas. When we are either in a class session, usually towards the end, before finishing our classroom studies, we say that before we conclude, we must practice. We are given one week to practice in the skills lab based on what we learned in theory (FGD III, Pt 3)

Although the duration of the SBE was brief, participants reported using that week effectively to learn practical skills, as illustrated:

...we have 4 weeks of classes... we are given one week for the skills lab, so we effectively use one week for the skills lab (FGD II, Pt 4)

The study also found that the time set for certain individual procedures was not sufficient. For example, if a procedure typically requires more than five minutes to complete properly, but the total time allocated for all individual procedures is only five minutes, then there is a mismatch. Participants reported that the issue is that the total time allowed for individual procedures is less than what is needed for some of the procedures due to the fact that some of them require more than the time allotted. Because the allotted time is too short, it's impossible to perform the procedures effectively or correctly. Participants stated that it led to incomplete or incorrect performance of the procedures, affecting the overall quality and it could also pose a challenge when performing that particular procedure to real patients in the clinical area. One participant said:

The significant challenge we face is time. I will emphasize the issue of time because we are supposed to perform well, but if, for example, we are given only 5 minutes, and the procedure is too long, you find yourself stuck in the middle. You didn't finish

well, even though you started well. So, it becomes challenging to go to a real patient and perform that procedure (FGD III, Pt 4)

4.2.4 Perspectives on How to Improve Simulation-Based Education

Participants were asked to state their views on areas that could be improved to make SBE learning experience better. Their responses revealed that increased time for simulation and improved learning facility would add more to make SBE learning experience better. The findings in this theme are grouped into two subthemes namely: advocating for increased resources and suggestions regarding the actual conduct of simulation activities.

4.2.4.1 Advocating for Increased Resources

The study found that enhancing SBE training requires increasing the number of trained personnel available in the skills lab. Participants proposed that having multiple SBE-trained staff working in shifts would allow the lab to be open for longer periods. This would give students more extended access to practice, as opposed to the current limited hours when only one or a few staff members are available. One participant gave the following account:

... we know there are teachers who specialize in the skills lab. If they could add more of them, it would be better for us to learn anytime we go. Because apart from the teachers who teach us, the one dealing with the skill lab is just one, and considering they are human, they get tired. So, it's not easy for you to go anytime (FGD IV, Pt 2)

Another participant added:

Maybe they should add another supervisor for the skills lab because currently, there is only one... so if that one has an emergency, there is no backup (FGD II, Pt 5)

Together with having additional instructors or supervisors, more resources such as mannequins and consumable items were recommended to making learning in the skills lab smooth. Increasing resources, such as more trained staff or extended lab hours, would allow each student more opportunities to practice. This would ensure that all students get adequate hands-on experience. Participants emphasized the need for additional space dedicated for SBE. They suggested that the institution should consider building a new facility specifically for the skills lab. The argument was that while the college has grown significantly currently offering more programmes and accommodating a larger number of students, the skills lab space has remained unchanged. This mismatch between the institution growth and available facilities limits the effectiveness of training. Expanding the skills lab would provide more room for simulations, allowing for better practice and more effective learning experiences as described below:

To improve this simulation, the first thing is to provide us with equipment that will help us practice... Hmm, equipment should be brought in abundance (FGD II, Pt 2)

I would like to add that since the institution has various courses, at least we should have additional skill labs. Have at least two skill labs with sufficient equipment, because all four courses are required to use the skill lab. We shouldn't rely on just one skill lab; we should have at least two and more (FGD I, Pt 1)

4.2.4.2 Suggestions Regarding the Actual Conduct of Simulation Activities

Participants described their viewpoints regarding the actual conduct of simulation in terms of increased time for simulation, proper students' supervision in the skills lab and having smaller groups in the skills lab. The findings show that more time should be allocated for SBE. Participants argued that the current one week per semester time allocated for SBE was not sufficient to cover the whole content discussed during the whole period of four weeks of theoretical learning. One participant suggested that at least two weeks would be enough for them to put in practice what they have learnt in class as illustrated below:

> *There should be ample time for these practices because if you look at it, they provide limited time, just one week, and within that week, there are many things to learn. Each subject has its simulations and schedules, so they should extend the time, maybe to two weeks, to ensure that these procedures can be taught equally and comprehensively (FGD V, Pt 6).*

> *So, let us be given more time, maybe two weeks within those 5 weeks … Two weeks could be enough… (FGD II, Pt 2).*

Another suggestion for enhancing practice time through SBE was to extend the skills lab's operating hours. Participants recommended that the lab be open for at least 12 hours each day, including weekends. This would provide students with greater flexibility to use the lab according to their schedules. Such extended hours would ensure that students have ample time to practice and refine their skills outside of regular class hours. One participant said:

I would like in simulation; it could be open for a bit longer, maybe 12 hours… Even weekends should be open so we can enter and learn (FGD III, Pt 3)

Participants recommended revising the time allocated for performing specific procedures, advocating for more realistic timeframes based on the complexity of each simulation. They suggested that current time limits may not reflect the actual time needed to perform procedures accurately as stated below:

Personally, I think we should be given a bit more time, at least, for example, if the procedure for manual removal of the placenta is given more time, say 10 minutes, it would be better (FGD III, Pt 6)

In terms of proper supervision of students, participants suggested that teachers are supposed to supervise all groups of students utilizing the simulation lab equally rather than leaving students to guide or teach each other in the group. Participants also added that they would prefer simulation sessions to be participatory rather than just involving few students. That means, each student should play an active role in simulations. To ensure active participation, each student should bring a notebook to every simulation session. This allows them to take notes and record key observations, which can be used for reference and review. Note-taking helps reinforce learning and ensures that students can track their progress and understanding throughout the simulations. Few participants said:

…teachers should supervise from the first group to the last, rather than leaving students to guide each other within the groups (FGD I, Pt 6)

I would prefer the simulation to be participatory…. Every participant should be able to contribute effectively. It shouldn't be limited to a few participants teaching others. Every participant should be able to engage and understand (FGD V, Pt 6)

Additionally, teachers should emphasize that students bring notebooks or counter books or even diaries when they go for practice. They should have a space to write because many students arrive without any notes. So, they just observe and leave, and the next time, they struggle to remember (FGD V, Pt 2)

In addition to that participants suggested that teachers or facilitators should have a positive attitude towards students during the SBE learning process. The friendly attitude not only reduces fear on the side of students but makes it easy for students to seek help or clarification during learning. One participant stated:

I would like to request that those who teach us simulations, it would be good if they were friendly. Even though they are teaching us serious matters that we will encounter with real people, it doesn't mean the person should be too strict. If they are friendly, we feel more encouraged to participate, ask questions, and clarify when we don't understand. If they are friendly, they can better gauge who has understood and who might need more assistance. So, they should try to be friendly and not too intimidating (FGD V, Pt 5)

Another participant added that having a good relationship with teachers or facilitators removes fear which was termed as an obstacle:

Also, I think teachers should be closer to us. ... Having that friendship and closeness would help remove the fear so that I can perform well because removing

fear is removing the obstacle. … When you see a teacher standing and criticizing, you find yourself unable to perform well (FGD III, Pt 6)

Regarding the issue of having smaller groups in the simulation lab, the study revealed that for simulation to be done efficiently and effectively, there must be small learning groups for simulation. Participants suggested that each group should consist of 10 to 15 students to ensure meaningful participation from everyone. This size allows each student to actively engage in the simulation rather than just being a passive observer. A small group ensures more hands-on experience and effective involvement for each student. Small groups also enhance student concentration and participation in simulated procedures by assigning each student a specific role. This structure ensures that every participant is actively involved in the simulation, rather than passively observing. With clearly defined responsibilities, students are more engaged and focused, which improves their learning experience. Two participants gave the following account:

I think it's good to reduce the number of people because it will help everyone to participate. When there are too many of us, the teacher has to select a few to demonstrate after teaching. So, taking fewer students will help each one to participate after the teacher has taught (FGD V, Pt 4)

I would emphasize that they should select fewer students. For example, in our class, we go in groups of 25 to 30, so they should reduce that to around 10 or 15. This will help us to be more attentive and focused (FGD V, Pt 2)

CHAPTER 5: DISCUSSION OF THE FINDINGS

5.1 Introduction

This study explored perceptions of diploma in nursing and midwifery students on SBE education specifically their experience, perceived benefits, perceived challenges and suggestions for improvements. It should be noted that SBE is not a new teaching approach in the world. However, its application especially in low-resource settings has recently started to gain popularity. The selected study site started to use SBE in the past six years although it is not commonly used in other institutions of the same level. Based on the data collected to address the objectives of this study and the analysis done, findings have revealed several insights into perceptions of diploma in nursing and midwifery students on SBE in a selected teaching institution.

This chapter discusses the findings of this study in relation to literature available on the area of simulation. The discussion will be grouped into three subtopics consistent with the four themes that emerged from the analysis. The chapter starts with the discussion of findings then strengths and limitations of the study and finally practical recommendations will be given.

5.2 Experience of Simulation among Nursing Students

The study demonstrates that during SBE, students' learning is taking place by observing and participating or engaging in hands-on performance of procedures in the simulation lab. Learning by participating was found to increase competency compared to observing. This could be facilitated by the fact that the institution has a simulation lab and is implementing SBE though in a limited setting. Learning by observing or participating in

hands-on performance of procedures has been a subject of studies and various reactions from students both positive and negative have been documented. For example, according to Stiefel et al. (2013) and Harder et al. (2013) when roles are assigned in simulations, students preferred a role of participating in the hands-on performance of procedures rather than taking on an observer's role. On the other side, Thidemann & Söderhamn (2013) demonstrates that students preferred the role of an observer compared to other roles of playing as a family members or as nurses.

However, both observer's role and other roles enabled students to learn in various ways how to manage patients in a real clinical environment (Harder et al., 2013; Thidemann & Söderhamn, 2013). It can also be argued that learning outcomes for both participants and observers in simulations can be valuable if all roles engage in active learning, either through hands-on involvement in the simulation or by observing using tools to enhance active observation (Regan et al., 2016). It is also suggested by Reime et al. (2017) that students can benefit more if they play different roles each time a simulation scenario is set up in order to allow them to have the feel of various roles and benefit from each without necessarily having to memorize specific roles.

The study also reveals that students experienced short overall durations for simulations, with only one week per semester dedicated to SBE, occurring after covering the theoretical coursework and prior to clinical placements. This may be attributed to the institution's internal scheduling arrangements and how time is allocated within the curriculum. SBE serves as a transition between classroom and clinical learning in which the theoretical part covered in the class is put into practice through hands-on performance of procedures in the simulation lab (Botma, 2014; Kaddoura et al., 2016). The duration and

scheduling of simulation time vary significantly across different studies. Botma (2014) found that Students started using SBE in their first year; however, during the first two years, simulations involved only standardized patients, while in the third and fourth years, both high-fidelity simulators and standardized patients were used with equal number of simulations. The study does not specifically mention the duration in a semester or year in which students were exposed to simulation. Najjar et al. (2015) found that students were exposed to simulations four to twelve times per academic year which is similar to one week in a semester. The study does not tell specifically how simulations were integrated within theoretical coursework learning. While the duration of SBE varies across studies, it is generally most effective when scheduled immediately after theoretical learning and just before clinical practice as it maximizes the integration of knowledge and preparation for real-world application (Elshama, 2020). Chernikova et al. (2020) also argues that SBE can be effectively incorporated early in study programmes, offering advantages to both beginners and advanced learners. For those just starting out, simulations serve as a hands-on and interactive method to understand basic concepts and skills within a controlled setting, helping them develop confidence and proficiency from the beginning. For more experienced learners, simulations provide a platform to refine their skills, tackle complex scenarios, and apply their knowledge in practical, real-world situations.

The findings of this study reveal that students learn several complex procedures and skills such as insertion of intravenous lines, insertion of both male and female urinary catheter, intramuscular injections, delivery of the baby, newborn and adult resuscitation and managing postpartum hemorrhage during SBE. Several other studies have found that similar procedures can be performed using simulation (Angelina et al., 2021; Egenberg et

al., 2017; Oliveira et al., 2014; Zhao et al., 2019). However, the fidelity of procedures varied significantly across studies, depending largely on the type of procedure and the setting in which it was conducted. Other limited settings are also found to use LFS to teach similar procedures such as active management of third stage of labour (Angelina et al., 2021) and management of postpartum hemorrhage (Egenberg et al., 2017). Low fidelity mannequins are very effective in imparting knowledge and skills for specific procedures as they provide a practical, hands-on experience that enhances learning despite their simpler design (WHO, 2018).

However, similar procedures learned using low-fidelity, were found to be taught high resource settings using high fidelity mannequins. For example, Kaddoura et al. (2016) used HFS to teach adult and neonatal rescusitaion. Although, it is worth noting that WHO (2018) in its guideline for simulation in nursing and midwifery education requires educators to understand that simulation does not necessarily need to be high fidelity because low and medium fidelity using well designed scenarios are as well very effective in achieving learning outcomes. The guideline also recognizes that if resources are limited, which is the case for this study, low and medium fidelity can be more appropriate as they incur less costs compared to HFS. Low and medium fidelity simulators are easy to maintain and repair in case of faulty and they can be used even during power cuts without interfering or necessitating sessions' postponements.

One of the key findings for this study is the joint simulation between students and clinical staff in which students had an opportunity to simulate clinical procedures in collaboration with qualified nurses and midwives at least once a week during clinical practice. Joint simulation with qualified healthcare professionals is highly beneficial as it

allows students to practice in a safe environment alongside experienced individuals who are skilled in real patient care (Aamlid & Tveit, 2022). Studies have been conducted on simulation involving qualified healthcare professionals working independently in resource-limited settings. For example, Egenberg et al. (2017) in Tanzania reports on multi-professional training on management of postpartum hemorrhage among qualified nurses, midwives, doctors and medical attendants. Zhao et al. (2019) in Ethiopia reports a simulation-based training on various midwifery procedures among skilled birth attendants. Angelina et al. (2021) in Tanzania reports on the impact of LFS on nurses' competence in active management of third stage of labor among qualified nurses working in primary healthcare settings.

Conversely, numerous studies have focused on interprofessional simulations, where students from various healthcare fields work together on procedures within simulation or skills labs to enhance teamwork and communication among different healthcare professionals (Ferri et al., 2018; Kleib et al., 2021; Krielen et al., 2023). However, only a few studies have been done on simulation as a joint learning activity between students and qualified healthcare professionals. For example, Aamlid & Tveit (2022) conducted a study on a joint simulation activity between students and qualified nurses. The study found that this collaboration allowed students to engage in complex clinical scenarios with experienced nurses, thereby enriching their learning experiences and enhancing their relationships with nursing professionals. Additionally, this collaboration helped students deepen their understanding and skills in real-world situations.

5.3 Benefits of Simulation-Based Education for Nursing Students

The study revealed that SBE significantly improved students' knowledge acquisition by providing effective practical learning experience that deepen their understanding on the subject matter. Knowledge acquisition can only be accomplished when students have the opportunity to perform procedures in the simulation or skills lab before they are exposed to real patients' care, allowing for easy theory to practice integration (Botma, 2014). Together with the fact that knowledge acquisition starts in the class room, SBE helps to cement, accomplish and bring more sense to the subject matter that is learnt theoretically in the class room (Kaddoura et al., 2016). Accomplishing the knowledge acquisition process is referred to as building bridges for action in which students' knowledge is expanded and consolidated (WHO, 2018).

SBE enables students to have more capacity of acquiring and retaining knowledge compared to traditional methods of teaching (Botma, 2014; Cant & Cooper, 2017; Eldoushy, 2019). Stevens et al. (2023) argues that knowledge acquisition and retention happens more during the debriefing phase of simulation. However, Akhu-Zaheya et al. (2013) found no difference in knowledge acquisition and retention between students taught basic life support (BLS) by SBE and those taught by traditional methods of learning. Basic Life Support training with HFS is as effective as traditional methods. This could be attributed to the limited duration of the simulation sessions. According to Akhu-Zaheya et al. (2013), students were only exposed to SBE for a short period, which may not have been sufficient to highlight the differences between SBE and traditional methods in terms of knowledge acquisition and retention. Therefore, improvements in both acquired and retained knowledge may be observed through repeated BLS training with HPS throughout

the semester. Furthermore, the variation in study findings could probably be due to differences in study approaches, methodologies, sample size and settings whether high or limited in facilitating SBE.

This study shows that SBE helped students in acquisition of practical skills through hands-on practice on mannequins. The experience that students gain through their practice in SBE enables them to work as experts or professionals in the actual clinical area because they easily translate their prior experience of working with mannequins in simulation to working with real patients in the actual clinical area (Botma, 2014). The hands-on practical skills students acquire during SBE are considered as crucial factors contributing significantly to their learning (Saeed et al., 2023). Several skills such as prioritization skills, communication skills and nursing assessment skills were all improved by SBE (Alshutwi et al., 2022). The practical skills acquired during SBE enables students or qualified healthcare professionals to have an increased speed in decision making which is quite very useful especially during emergency situations (Moslehi et al., 2022). Stevens et al. (2023) adds that the practical skills gained during SBE enabled students to experience and refine clinical judgment even when they were not in a clinical setting.

The study also revealed that through simulation, students can perform procedures in the actual clinical area with less or no mistakes thereby ensuring patients' safety. Having a proper knowledge or understanding of what to do to the patient and how to do it is very vital in patients' care especially on their safety (Botma, 2014). Simulation allows students to learn from their mistakes and make corrections in a controlled setting which is the simulation lab, ensuring no real harm comes to patients (WHO, 2018). According to Changuiti (2021) simulation creates a learning environment that is safe and controlled

where mistakes can be done without any lethal effect as it does not involve real patients. Lestander et al. (2016) further reports that reducing mistakes in the actual clinical setting ensures that students are well-prepared to perform procedures accurately and confidently. This careful preparation minimizes the risk of compromising patient safety, leading to better outcomes and trust in clinical care. Repeated exposure to simulation, verifying patient's identity and learning from one's mistakes were specifically reported as elements that enabled students not to compromise patients' safety (Lestander et al., (2016). In addition to that Moslehi et al. (2022) argues that interdisciplinary simulation which develop high performing healthcare teams also contribute to reduction of errors and promotion of patients' safety during students' actual clinical practice. That could be due to an opportunity that students or healthcare workers from different professionals get to work together and thereby improving team work and thus reduce chances of making mistakes in actual patients' care.

Further findings from this study reveal that SBE improves students' confidence which can also be described as overcoming fear during actual clinical practice. The confidence gained is contributed to by prior exposure to the procedures and knowing what and how to do them (Botma, 2014). İzolasyonlu et al. (2020) describes the increased self-confidence that it was primarily developed during the debriefing phase of SBE, where constructive discussions about the procedure is taking place. This discussion enhances students' comfort and courage when performing procedures in real clinical settings. In addition to that, Sundler et al., (2015) found that the confidence in performing procedures in the actual clinical environment was developed due to the professional knowledge and skills gained during SBE. Several other studies agree with the findings of this study on the

significance of SBE in enhancing students' self-confidence in providing care to patients in the actual clinical area (Valizadeh et al., 2013, Cant & Cooper, 2017, Foronda et al., 2013). The WHO (2018) clearly states that students' low self-confidence in performing procedures is associated with high levels of anxiety, delays in implementation of procedures and errors in performance. To tackle these challenges, it is crucial to implement SBE, as it fosters self-confidence in students and helps them overcome their fears.

5.4 Challenges Faced by Nursing Students During Simulation: Missed Opportunities for Improvement

The findings of this study show that limited resources for learning during simulation such as mannequins, personnel, space for simulation and other consumable items like gloves posed a challenge to students. Being a limited resource setting and having a large number of students could be some of the factors contributing to a significant shortage of resources. The shortage of resources might sometimes lead to compromised care in the actual clinical area due to lack of practice for some students or using alternative items in performing procedures like the use of clean gloves instead of sterile gloves to perform sterile procedures. Similar findings were reported by Eldoushy (2019) in Egypt where by limited resources was described in terms of insufficient number of simulators and insufficient number of well-equipped simulation laboratories. The other angle of limited resources apart from shortage of equipment was described in terms of shortage of trained educators specialized in SBE (Swart et al., 2019). Together with the fact that shortage of resources is a common challenge in resource-limited settings like where this study was conducted, WHO (2018) suggests that even in low-resource settings SBE can be implemented utilizing low fidelity mannequins. A study conducted in Lesotho

demonstrated that even in settings where there is shortage of resources in the simulation laboratories, students can still get sufficient instructional support (Moabi, 2022). However, that should not save as an excuse for not having sufficient learning resources.

To overcome the challenge of limited resources, the findings of this study amplify perspectives from students that advocates for more resources both human and non-human. It can be argued that due to increase in number of students and programmes offered, number of resources including learning space (skill labs should be increased as well as having smaller groups of at least 10 students each to give an opportunity for every student to participate in the simulation. Similar suggestions stressing the need for smaller groups are reported (Eldoushy, 2019). In addition to that, smaller groups gives opportunity for students to interact with each other and with the faculty (instructor) during simulation (Saeed et al., 2023). Subdividing students into smaller groups can result into another challenge of having many groups which may overwhelm the facilitator; however, close collaboration among facilitators (instructors) may help to address this challenge.

The study also found that some facilitators had negative attitudes during learning which threatens students and sometimes diminishes the learning environment. According to Persico et al. (2021) facilitators should support students throughout all the phases of SBE. Their responsibilities encompass planning and executing the simulation, setting up equipment, creating a conducive learning environment, designing scenarios, and leading reflective discussions during the debriefing phase to ensure learning objectives are met. Grant et al. (2018) acknowledges the existence of difficult debriefing situations in which the facilitator might encounter leaners who are disinterested, quiet, with defensiveness, with poor knowledge and one who dominates others. These types of learners could prompt

facilitators to use less effective strategies for managing these situations. However, a range of solutions is also recommended to handle these situations, ensuring that the debriefing phase of SBE remains a productive learning environment.

Another profound challenge revealed in this study is insufficient time allocated for SBE compared to classroom theory and practical in the clinical area. This could be due to fixed hours in the curriculum for that particular programme or due to internal arrangements by the institution. Eldoushy (2019) similarly reports that generally the time allocated for SBE was not sufficient compared to the number of procedures to be performed. The findings from Swart et al. (2019) in South Africa revealed that the inadequate time dedicated for simulation emerged as the most prominent perceived challenge faced by healthcare professionals in South Africa during the implementation of SBE.

This study highlights several students' perspectives for overcoming the challenge of limited time for SBE such as extending the simulation duration from one week to two weeks or longer, and integrating simulation into theoretical classroom teaching. Although there is no agreement on the particular amount of time that students should spend on SBE, Elshama (2020) argues that SBE should be given enough time to meet the intended learning objectives for the particular course. The time for SBE should allocated in the curriculum because that is the overall guide for implementation of every programme.

5.5 Strengths and Limitations

This study is one of the first studies to be conducted on perception of students on SBE after its inception in 2017. It reports primary information on perceptions according to the viewpoints of students who are regarded as beneficiaries of SBE. The use of FGD in data collection offered a group dynamic which allowed participants to build on each other's

ideas and insights, leading to a richer exchange of perspectives. This interaction often uncovers deeper understanding by prompting discussions that might not occur in in-depth individual interview.

However, the study had few limitations as follows: Firstly, the data was collected from just one institution which might not accurately reflect conditions or results at other institutions. This means the findings could be unique to that specific institution and may not be generalizable to different settings. Secondly, due to the use of only FGD as a method of data collection, the study might have missed some important findings that would probably be expressed in details through in-depth interviews. Although it is worth noting that in-depth interviews were probably not necessary because there were no key informants among the participants as they all had equal or similar exposure to SBE.

5.6 Recommendations

Based on the existing body of evidence on the benefits of SBE, the study strongly recommends for the integration of SBE into the curricula of all nursing and midwifery training institutions in low-resource settings.

The study also recommends using peer facilitators alongside faculty facilitators to effectively address the challenge of insufficient human resources in SBE by distributing the workload and increasing the number of available facilitators. Well trained peer facilitators can help manage simulations, provide feedback, and support debriefings allowing faculty to focus on high-level oversight and expert guidance. Additionally, it provides valuable leadership and teaching opportunities for peer facilitators, contributing to their professional development. When compared with faculty facilitators, peer facilitators was found to have the same effect in terms of confidence and students'

perception of effectiveness (Doherty-Restrepo et al., 2018). It can thus be recommended to employ peer facilitators alongside faculty facilitators to mitigate the issue of having a limited number of faculty facilitators in SBE.

Additionally, it is recommended institutions implementing SBE invest in low-fidelity mannequins, as they are more cost-effective and suitable for settings with limited resources. According to WHO (2018), it is not a must for simulation to be high fidelity because low and medium fidelity employing well-designed scenarios can also be quite useful in addressing learning objectives. Evidence indicates that well-structured low-fidelity simulation activities can achieve the same learning outcomes as high-fidelity simulations (Massoth et al., 2019). This suggests that effective simulation-based learning does not always require expensive, high-tech equipment. It can thus be recommended that in limited resource settings, low and medium fidelity simulators be used as they are easy to maintain and repair in case of faulty and they can be used even during power cuts without interfering or necessitating sessions' postponements.

Furthermore, the study recommends teachers and facilitators to receive supportive supervision and refresher trainings on how to facilitate simulations in order to avoid negative students' treatment during the process. Grant et al. (2018) proposed a toolbox for educators to use in order to combat difficult situations that might cause negative facilitators attitudes. Teachers and facilitators are encouraged to become more familiar with these strategies and use them during SBE.

5.7 Areas for Further Research

Given that the study was conducted only among students, future studies should be undertaken to study the challenges that educators and educational institutions experience

during the implementation of SBE in limited resource settings in order to design an intervention that is multifaceted. This will help figure out what teachers perceive as challenges and eventually help in developing an intervention that will address those challenges from both perspectives. It is also recommended that studies be conducted among students who graduated from institutions that use SBE and those from institutions which do not use it to determine variations in knowledge, attitude, and abilities in patient care.

5.8 Conclusion

Perceptions of diploma in nursing and midwifery students indicate that SBE is a highly effective teaching method even in resource limited settings. Experience of students in learning through SBE shows that students learn various clinical procedures and skills. Although nursing and midwifery students had limited access to SBE during the semester, which was further disrupted by the presence of students from other programmes within the institution, SBE stands to be a valuable teaching approach for developing practical skills and gaining hands-on experience in a safe environment. This positive feedback highlights the role of SBE in enhancing learning and preparation for real clinical situations. It enhances students' skills, knowledge and builds their confidence by allowing them to practice and refine their techniques before engaging in real clinical situations. As a result, it reduces the likelihood of errors and potential harm to patients during actual clinical practice. However, several challenges such as limited resources for practicing in the simulation lab, negative attitudes of facilitators, insufficient time for SBE and large number of students were highlighted. These challenges can positively be turned to opportunities for creating ideal environment for SBE. Creating more time for SBE, reducing the number

of students engaging in one session of simulation, advocating for more resources both human and non-human, are some of the suggestions to improve SBE.

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APPENDICES

Appendix 1. Focus Group Discussion Guide (English)

Total focus group time: …….

Number of Participants: ……..

Moderator: .....

Note-taker: ……..

Starting time…….. Finishing time ……..

Discussion Guidelines:

- The discussion is informal, there's no need to wait for the facilitator to call on you to respond. In fact, you are encouraged to respond directly to the comments of other people
- If you do not understand a question, please let the facilitator know.
- The facilitator will be asking questions, listening, and make sure everyone has a chance to share while the note taker will take notes to compliment the recorded information.
- You will be asked that you all should keep each other's identities, participation and remarks private.
- It is hoped that you will feel free to speak openly and honestly.
- As discussed, we will be recording the discussion, because we do not want to miss any of your comments.
- No one outside of this room will have access to the recorded audio.
- There is no right or wrong answer as these are your views and we respect that.

Opening (5min)

- Opening remarks; self-introduction and explanation of discussion guidelines/rules. Giving them numbers that will make it easy during transcription and analysis. The moderator will mention the number of the participant before the participant contributes to the discussion.

Demographic Data

- Sex ……

- Age ……

Questions

1. How do you understand simulation-based learning?
2. How long have you been learning through simulation-based education?
3. Would you kindly describe your experience in learning through simulation-based education?
4. How has simulation-based education benefited you as a student?

   Probes: - What else? What about benefits in learning? In the clinical area?
5. What are the challenges you have encountered as students while learning through simulations?

   Probes: - What else? What about time allocated? What about the resources? What about the actual simulation?
6. What do you think could be improved about how simulation-based education is conducted in this institution?

Appendix 2. Focus Group Discussion Guide (Kiswahili)

Jumla ya muda uliotumika: …….
Idadi ya washiriki: ……..
Msimamizi: .....
Mtunza kumbukumbu: ……..

Muda wa kuanza…….. Muda wa kumaliza ……..

Ufunguzi (dakika 5)

Maneno ya ufunguzi; kujitambulisha na maelezo ya miongozo/kanuni za majadiliano

Kuwapa nambari ambazo zitafanya iwe rahisi wakati wa unukuzi na uchambuzi. Msimamizi atataja nambari ya mshiriki kabla ya mshiriki kuchangia mjadala.

Taarifa binafsi

- Jinsia……
- Umri ……
- Amewahi kufanya kazi ☐
- Hajawahi kufanya kazi ☐

Miongozo ya Majadiliano:

- Majadiliano haya si rasmi sana, hakuna haja ya kusubiri hadi mwezeshaji akuite ili ujibu. Kwa kweli, unaweza kujibu tu moja kwa moja maoni ya watu wengine.
- Ikiwa umeshindwa kuelewa swali, tafadhali mwambie muwezeshaji akueleweshe.
- Mwezeshaji atakuwa akiuliza maswali, akisikiliza, na kuhakikisha kuwa kila mtu ana nafasi ya kushiriki huku mtunza kumbukumbu akiandika maelezo kuongezea kwenye taarifa iliyorekodiwa.
- Mnaombwa kutunza mazungumzo haya, pamojo na utambulisho wowote wa washiriki wa mjadala huu kuwa faragha.
- Inategemewa kuwa mtakuwa huru kuzungumza kwa ukweli na uwazi.
- Kama ilivyosemwa, tutakuwa tukirekodi mazungumzo haya kwa sababu hatutaki kukosa wala kukosea maoni ya mtu yeyote katika mjadala huu.

- Hakuna mtu mwingine atakayekuwa na uwezo wa kusikia tuliyorekodi isipokuwa timu ya watafiti pekee.
- Hakuna jibu la kweli au la uongo, kila jibu ni sahihi kwa kuwa hayo yatakuwa ni maoni yako.

Muongozo wa maswali

1. Je, unaelewa nini kuhusu kujifunza kwa njia ya kuiga (simulation-based education)?
2. Je, umejifunza kwa muda gani kupitia kujifunza kwa njia ya kuiga (simulation-based education)?
3. Je, unaweza kunielezea uzoefu wako kuhusu kujifunza kupitia njia ya kuiga (simulation-based education)?
4. Je, njia hii ya kujifunza imeweza kukusaidia kwa namna gani?

   Chunguzi: - Kingine? Vipi kuhusu faida katika kujifunza? Je katika mazoezi kwa wagonjwa hospitalini?
5. Je ni changamoto gani unakutana nazo wakati wa kujifunza kupitia njia ya kuiga (simulation-based education?

   Chunguzi: - Kingine? Vipi kuhusu muda uliopangwa kwa ajili ya kujifunza kwa njia hii? Vipi kuhusu vifaa vya kujifunzia? Vipi kuhusu kujifunza kwenyewe?
6. Je unadhani kitu gani kinaweza kuboreshwa jinsi mafunzo kwa njia hii yanavyofanyika katika taasisi hii?

Appendix 3. Information Sheet to Participants (English)

Perceptions of diploma in nursing and midwifery students on Simulation-Based Education at Hydom Institute of Health Sciences in Northern Tanzania.

My name is Wilson Saimon Eliamini pursuing a Master of science in Midwifery student at Kamuzu University of Health Sciences (KUHeS) in Blantyre, Malawi.

I would like to request you to participate in this research project that I am conducting as part of the requirements for the mentioned degree.

The purpose of this project is to investigate third-year nursing and midwifery students' perspectives on simulation-based education. It is critical because it will allow the researcher to learn what students who are the final users of simulation services think about it. Knowing this will aid in either improving simulation services in this context or establishing them in other similar contexts. Interviews will take place at the Haydom Institute of Health Sciences in Manyara, Tanzania. There is no harm that is expected to happen to you during the course of this study.

If you agree to participate in this study, you will be asked a few questions in a group or individually for no more than 40 minutes. The interview will take place at a time and location that is convenient for you.

All information collected during this research project will be treated confidentially throughout the course of the project where codes will be used instead of your name. The information will be presented in a written report. Further publications may later be relevant in connection with seminars, conferences and in the form of a scientific article.

The interview will be digitally audio-recorded and notes will be taken at the same time. All the information will then be transferred to the researcher's computer which will be protected with a password only known to the researcher.

Participation in this project is voluntary and you are free to withdraw at any time and there will be no penalty for doing so. If you would like to take part in the project, please complete, sign and return the enclosed consent form. If you have any questions about the research project or require further information you may contact the following:

Student: Wilson Saimon Eliamini

Email: esmwilson@gmail.com

Phone number: +255 743 043 760

Supervisors.

1. Ursula Kafulafula ukafulafula@kuhes.ac.mw
2. Gladys Msiska gmsiska@kuhes.ac.mw
3. Jane Rogathi jane.rogathi@kcmuco.ac.tz
4. Bodil Bø bodil.bo@uis.no

Thank you for your time.

Yours sincerely,

……..

Wilson Eliamini

Appendix 4. Fomu ya Taarifa kwa Washiriki (Kiswahili)

Mitazamo ya wanafunzi wa stashahada ya uuguzi na ukunga kuhusu kujifunza kwa njia ya kuiga katika taasisi ya sayansi za afya Haydom, Kaskazini mwa Tanzania.

Jina langu ni Wilson Saimon Eliamini mwanafunzi wa shahada ya pili ya ukunga katika chuo kikuu cha sayansi za afya Kamuzu, Blantyre nchini Malawi.

Ningependa kuomba ushiriki wako katika utafiti huu ambao naufanya kama sehemu ya kukamilisha masomo yangu katika shahada iliyotajwa.

Dhumuni la utafiti huu ni kutafiti mitazamo ya wanafunzi wa mwaka wa tatu kuhusu kujifunza kwa njia ya kuiga (simulation-based education). Hii ni muhimu sana kwa kuwa itampatia mtafiti nafasi ya kujua wanachofikiria wanafunzi kama watumiaji wa mwisho wa njia hii ya kujifunzia. Ufahamu huu utasaidia kuboresha huduma za kujifunza katika eneo hili ama kuanzisha kujifunza kwa njia ya kuiga katika maeneo mengine yanayofanana na taasisi hii. Majadiliano yatafanyika katika chuo cha sayansi za afya Haydom, Manya nchini Tanzania. Hakuna matokeo yoyote mabaya (madhara) yanayotegemewa kukupata kwa kushiriki utafiti huu.

Ukiwa tayari kushiriki utafiti huu, utaulizwa maswali machache katika kikundi au wewe binafsi kwa muda usiozidi dakika 40. Majadiliano haya yatafanyika mahali popote utakapopenda na kwa muda utakaokufaa.

Taarifa zote zitakazo kusanywa wakati wa utafiti huu zitatunzwa kwa faragha wakati wote wa utafiti na nambari badala ya jina itatumika kuficha utambulisho wako halisi. Taarifa hizi baada ya kuchakatwa zitawakilishwa kwa njia ya taarifa maalumu. Baadae, taarifa hizi

zitachapishwa na kuwakilishwa katika matamasha na washa mbalimbali kama chapisho la kisayansi.

Majadiliano haya yatarekodiwa na nukuu zitachukuliwa kwa wakati huo huo. Taarifa zote kisha zitawekwa kwenye kompyuta ya mtafiti ambayo itakuwa imefungwa na nwila inayojulikana na mtafiti peke yake.

Ushiriki katika utafiti huu ni wa hiari na upo huru kujitoa kwenye utafiti muda wowote na hakutakuwa na faini yeyote baada ya kufanya hivyo. Kama utapenda kushiriki katika utafiti huu tafadhali jaza na saini fomu iliyoambatanishwa hapa. Kama unaswali lolote kuhusu utafiti huu au unahitaji kujua Zaidi tafadhali wasiliana na wafuatao:

Mwanafunzi

Wilson Saimon Eliamini

Barua pepe: esmwilson@gmail.com

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Wasimamizi

1. Ursula Kafulafula ukafulafula@kuhes.ac.mw
2. Gladys Msiska gmsiska@kuhes.ac.mw
3. Jane Rogathi jane.rogathi@kcmuco.ac.tz
4. Bodil Bø bodil.bo@uis.no

Asante sana kwa muda wako

Wako mtiifu,

……..

Wilson Eliamini

Appendix 5. Form of Consent (English)

To whom it may concern,

I have been informed both orally and in writing about this work, “Perceptions of undergraduate nursing and midwifery students on Simulation-Based Education at Hydom Institute of Health Sciences in Northern Tanzania” and I hereby give my full informed consent that I understand and accept the responsibilities expected from me. I can at any time withdraw from the study without any further notice.

……	……	……
…	….	…
Participant’s Name	Date	Signature
……	……	……
…	….	…
Researcher’s name	Date	Signature

Appendix 6. Fomu ya Kibali (Kiswahili)

Kwa atakaye husika,

Nimetaarifiwa kwa njia ya maandishi na maelezo ya mdomo kuhusu utafiti huu wa "Mitazamo ya wanafunzi wa uuguzi na ukunga kuhusu kujifunza kwa njia ya kuiga katika chuo cha sayansi za afya Haydom kaskazini kwa Tanzania" na hapa ninakubali kwamba nimeelewa na nimekubali majukumu yanayotegemewa kutoka kwangu kama mshiriki wa utafiti. Muda wo wote ninauwezo wa kujitoa kwenye utafiti huu bila kuulizwa chochote.

……	…….	……
Jina la mshiriki	Tarehe	Sahihi
……	…….	……
Jina la mtafiti	Tarehe	Sahihi

Appendix 7. Ethical clearance from KCMUCo CRERC

CRERC 07

KILIMANJARO CHRISTIAN MEDICAL UNIVERSITY COLLEGE

(A Constituent College of Tumaini University Makumira)

P. O. Box 2240, MOSHI, Tanzania.

RESEARCH ETHICAL CLEARANCE CERTIFICATE

No. PG 124 / 2023

Research Proposal No. 124

Study Title: Perceptions of Diploma in Nursing and Midwifery Students on Simulation-Based Education at Haydom Institute of Health Sciences in Northern Tanzania

Study Area : Haydom Institute of Health Sciences

PI's Name : Wilson Saimon Eliamini

Co-investigators : Ursula Kafulafula, Gladys Msiska, Jane Rogathi and Bodil B

Institution (s) : Kilimanjaro Christian Medical University College

The Proposal was approved by CRERC on : 15th August, 2023

Duration of Study : One year

From : 15th August, 2023 to 14th August, 2024

PROF. MRAMBA NYINDO
Chair – CRERC

PROF. EPHATA KAAYA
Provost - KCMU College

Appendix 8. Ethical clearance from COMREC

KAMUZU UNIVERSITY

CERTIFICATE OF ETHICS APPROVAL

This is to certify that the Kamuzu University of Health Sciences (COMREC), has reviewed and approved a study entitled:

P.08/23-0236 – Perceptions of diploma in nursing and midwifery students on Simulation-Based Education at Haydom Institute of Health Sciences in Northern Tanzania by **Mr. Wilson Eliamini**

on

18/10/2023

As you proceed with the implementation of your study, we would like you to adhere to international ethical guidelines, national guidelines and all requirements by COMREC some of which are indicated on the next page for your study.

Prof. Eric Umar (Comrec Chairperson)

Approved by
College of Medicine
18/10/2023
(COMREC)
Research and Ethics Committee

Appendix 9. Support letter from Head of Midwifery Department

KAMUZU UNIVERSITY
OF HEALTH SCIENCES

SCHOOL OF MATERNAL, NEONATAL & REPRODUCTIVE HEALTH

To: The Chair Person, KUREC

FROM: Head of Midwifery department

DATE: 11th September, 2023

RE: LETTER OF SUPPORT FOR WILSON SAIMON ELIAMINI

I write to certify that Mr Wilson Saimon Eliamini has fulfilled the proposal requirements for his Masters in Midwifery programme at KUHeS. He is planning to conduct a research study titled *"Perceptions of diploma in nursing and midwifery students on simulation-based education at Haydom institute of health sciences in Northern Tanzania"*. His Supervisors are Dr Ursula Kafulafula and Dr Gladys Msiska. He has already received IRB approval from Tanzania and he is now applying for approval at KUREC. Please assist him accordingly.

If you have any questions about the student please don't hesitate to contact me at marthakamanga@kcn.unima.mw or at +(265) 999 217 985.

Sincerely,

Martha Kamanga, PhD

Head of Department - Midwifery

Appendix 10. Approval letter from the study site

HAYDOM INSTITUTE OF HEALTH SCIENCES
ELCT Mbulu Diocese

REF.HIHS/GVT/F.498/023 **12/09/2023**

Wilson Saimon Eliamini
P.O Box 360
CHICHIRI, BLANTYRE, MALAWI

RE: YOUR REQUEST TO CONDUCT A RESEARCH STUDY

Reference is made to your letter dated 10th September 2023.

Haydom Institure of Health Sciences has accepted your reguest to conduct a reseach study as specified in your letter. I therefore send this letter to you for confirmation of your reguest.

It is our hope that after your study you will share with the institute the findings of your research.

Yours in Service

HAYDOM INSTITUTE OF HEALTH SCIENCES
MANYARA
TANZANIA
P.O.BOX 9001 HAYDOM, MBULU

Dr. Fanuel Axwesso
FOR PRINCIPAL