

**Addis Ababa University**  
**College of Health Science**  
**School of Allied Health**  
**Department of Nursing and Midwifery**

Knowledge and perception towards clinical simulation in teaching undergraduate nursing students among Nurse Educators working at teaching institutions in Addis Ababa, Ethiopia.

**By: Mintesnot Tenkir Teni (BSc)**

A thesis submitted to Addis Ababa University College of Health Sciences School of Allied Health Department of Nursing and Midwifery for Partial fulfillment of Masters of Science in Maternity and Reproductive Health Nursing

June 2016

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**By: Mintesnot Tenkir Teni (BSc)**

**Email: [mintemim@gmail.com](mailto:mintemim@gmail.com)**

**Advisor: Mr. Tigistu Gebreyohannis (BSc, MSc)**

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Department of Nursing and Midwifery, School of Allied Health Sciences,  
College of Health Sciences, Addis Ababa University

Approved by the Examining board:

\_\_\_\_\_ **Chairman, Department of Graduate Committee**

\_\_\_\_\_ **Advisor**

\_\_\_\_\_ **Examiner**

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# TABLE OF CONTENTS

<b>ACKNOWLEDGMENTS</b> .....	I
<b>TABLE OF CONTENTS</b> .....	II
<b>LIST OF TABLES</b> .....	IV
<b>LIST OF FIGURES</b> .....	V
<b>LIST OF ABBREVIATIONS AND ACRONYMS</b> .....	VI
<b>ABSTRACT</b> .....	VII
<b>CHAPTER ONE: INTRODUCTION</b> .....	1
1.1 Background.....	1
1.2 Statement of the problem .....	3
1.3 Significance of the study .....	4
<b>CHAPTER TWO: LITERATURE REVIEW</b> .....	5
2.1 Nurse educators' knowledge toward clinical simulation .....	5
2.2 Nurse educators' perception toward clinical simulation.....	7
2.3 Summary .....	9
2.4 Conceptual Framework.....	10
<b>CHAPTER THREE: OBJECTIVES</b> .....	11
3.1 General Objective .....	11
3.2 Specific Objectives .....	11
<b>CHAPTER FOUR: METHODOLOGY</b> .....	12
4.1 Study area and period.....	12
4.2 Study design.....	12
4.3 Population .....	12
4.3.1 Source Population .....	12
4.3.2 Study Population .....	13
4.4 Eligibility Criteria .....	13
4.4.1 Inclusion Criteria.....	13
4.4.2 Exclusion Criteria.....	13
4.5 Sample size and Sampling procedure.....	13
4.5.1 Sample Size Calculation .....	13
4.5.2 Sampling Procedure and Technique .....	15
4.6 Variables .....	17
4.6.1 Dependent Variables .....	17

4.6.2 Independent Variables.....	17
4.7 Operational Definition.....	17
4.8 Data Collection Instrument and Technique .....	18
4.9 Data Quality Assurance .....	19
4.10 Data Processing and Analysis .....	19
4.11 Ethical Consideration .....	20
4.12 Dissemination and utilization of results .....	20
<b>CHAPTER FIVE: RESULTS .....</b>	<b>21</b>
5.1. Socio-Demographic Characteristics .....	21
5.2 Nurse educators' knowledge toward clinical simulation .....	22
5.3 Nurse Educators Perception towards Clinical Simulation .....	27
5.5 Qualitative Data Analysis.....	33
5.5.1 Key informant interview findings .....	33
5.5.2 Focused group discussion findings .....	36
<b>CHAPTER SIX: DISCUSSION.....</b>	<b>41</b>
<b>CHAPTER SEVEN: STRENGTH AND LIMITATION OF THE STUDY .....</b>	<b>45</b>
7.1 Strength of the study .....	45
7.2 Limitation of the study .....	45
<b>CHAPTER EIGHT: CONCLUSION.....</b>	<b>46</b>
<b>CHAPTER NINE: RECOMMENDATION .....</b>	<b>47</b>
<b>REFERENCES .....</b>	<b>48</b>
APPENDIX I: INFORMATION SHEET AND CONSENT FORM.....	52
APPENDIX II: QUESTIONNAIRE .....	53
APPENDIX III: KEY INFORMANT INTERVIEW GUIDELINES.....	58
APPENDIX IV: FOCUSED GROUP DISCUSSION GUIDELINES .....	59

## LIST OF TABLES

Table 1 Socio-demographic characteristics of nurse educators in Addis Ababa, Ethiopia March 2016. ....	22
Table 2 Knowledge of some basic concepts of clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016. ....	24
Table 3 Correct responses about knowledge towards clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016. ....	26
Table 4 Perception of nurse educators towards clinical simulation in nursing education in Addis Ababa, Ethiopia, March 2016. ....	28
Table 5 Positive perception towards clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016. ....	30
Table 6 Association for knowledge towards clinical simulation among nurse educators by selected socio demographic characteristics, Addis Ababa, Ethiopia March 2016. ....	31
Table 7 Association for perception towards clinical simulation among nurse educators by selected socio demographic characteristics, Addis Ababa, Ethiopia March 2016. ....	32

## LIST OF FIGURES

Figure 1: Conceptual framework for the determinants of the Knowledge and Perception of Nurse Educators towards Clinical Simulation developed using a one developed for the determinants of the Knowledge and Perception of Nurse Educators towards Clinical Preceptorship in Addis Ababa, Ethiopia (32).....	10
Figure 2: Schematic diagram of sampling procedure.....	16
Figure 3 Source of information about Clinical simulation among Nurse Educators, Addis Ababa, Ethiopia March 2016.....	25
Figure 4 Distribution of Knowledgeable and Not-knowledgeable Nurse Educators towards Clinical Simulation, Addis Ababa, Ethiopia March 2016.....	26
Figure 5 Positive and negative perception towards Clinical Simulation among Nurse Educators, Addis Ababa, Ethiopia March 2016.....	30

## LIST OF ABBREVIATIONS AND ACRONYMS

<b>AACN</b>	American Association of Colleges of Nursing
<b>AOR</b>	Adjusted Odds Ration
<b>CI</b>	Confidence Interval
<b>COR</b>	Crude Odds Ratio
<b>CPR</b>	Cardio-Pulmonary Resuscitation
<b>HERQA</b>	Higher Education Relevance and Quality Agency
<b>HINARI</b>	Health Internetwork Access to Research Initiative
<b>EBP</b>	Evidence Based Practice
<b>HPS</b>	Human Patient Simulation
<b>IRB</b>	Institutional Review Board
<b>JHPIEGO</b>	John Hopkins Program for International Education in Gynecology and Obstetrics
<b>MEPI</b>	Medical Education Partnership Initiative
<b>MoE</b>	Minister of Education
<b>MoH</b>	Minister of Health
<b>NGOs</b>	Non-Governmental Organizations
<b>RN</b>	Registered Nurse
<b>SCE</b>	Simulated Clinical Experience
<b>SPSS</b>	Statistical Package for the Social Sciences
<b>USA</b>	United States of America

## ABSTRACT

**Background:** Simulation is a teaching and learning strategy that is increasingly used in nursing education to prepare students for the clinical workplace. Simulation is defined as activities that mimic the reality of a clinical environment and are designed to demonstrate procedures, decision making and critical thinking through techniques such as role playing and the use of devices such as interactive videos or manikins.

**Objective:** To assess knowledge and perception towards clinical simulation among nurse educators working at teaching institution in Addis Ababa, Ethiopia.

**Methodology:** An institution based cross sectional study was used in teaching institution located in Addis Ababa, Ethiopia. The study generates quantitative and qualitative data with different measurements. One hundred three nurse educators were selected from nine health science teaching institution with simple random sampling. Data was analyzed using SPSS version 20. Logistic regression was done to identify association between the dependent and independent variables. The qualitative data was gathered through a key informant interview and a focused group discussion.

**Results:** Among the nurse educators 59.6% were found knowledgeable about clinical simulation. Of the respondents 74.4% of them found to have a positive perception about clinical simulation. A statistically significant association was found between educator's qualification and knowledge toward clinical simulation. The key-informant interview and FGD revealed that principal persons and students believe clinical simulation is very important teaching methodology but there are a lot of challenges to apply it, lack of material and skilled personnel being the main challenge.

**Conclusion and Recommendation:** Majority of the respondent were found to be knowledgeable about clinical simulation. Most of the respondent also found to have a positive perception toward clinical simulation. Teaching institution should give emphasis to advance knowledge of academic staff toward clinical simulation. Responsible government bodies and teaching institutions needs to make the clinical skill rooms well equipped with a skilled man power and required materials.

**Key words:** Clinical simulation, Nurse Educators, Knowledge, Perception

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Simulation is a teaching and learning strategy that is increasingly used in nursing education to prepare students for the clinical workplace. It has existed in nursing education in many forms and the first healthcare simulation manikins were introduced in the early 1960s (1).

Nursing is a practice-based profession that is built on theoretical knowledge, both of which is gained through a program of nursing education (2). Nursing education faces the challenge of preparing graduates to face the complexities that are found in today's health care environment. Upon graduation, new nurses must be able to care for patients in a fast-paced environment that emphasizes clinical competence and accurate, timely decision-making skills (3).

Schools of nursing are required to provide students with both theory and clinical opportunities relative to the scope of nursing. Nursing educators who teach in baccalaureate programs foster critical thinking and communication skills through didactic and clinical instruction, as well as learner activities such as simulation (4).

Simulation in the education of health care practitioners is not a new concept. Nehring notes that as early as 1847, the Handbook for Hospital Sisters called for "every nursing school to have 'a mechanical dummy, models of legs and arms to learn bandaging, a jointed skeleton, a black drawing board, and drawings, books, and models'(5).

Jeffries defines simulated practice as: activities that mimic the reality of a clinical environment and are designed to demonstrate procedures, decision making and critical thinking through techniques such as role playing and the use of devices such as interactive videos or manikins. A simulation may be very detailed and closely simulate reality, or it can be a grouping of components that are combined to provide some semblance of reality (1).

According to Piscotty, Grobbel, and Tzeng there are several reasons simulation has expanded in to clinical education: lack of available clinical sites, time, and faculty

constraints have promoted the development of effective simulation methods (6). And Feingold, Calaluca, & Kallen, states the use of simulation has grown in nursing education, due in part, to increased availability of the technology and to the benefits offered to students and teachers (7).

Medley & Horne and Valler-Jones et al., (cited by (1)) stated that simulation does not replace the need for learning in the clinical practice setting, it rather allows the student to develop their assessment, critical thinking and decision-making skills in a safe and supportive environment. According to Ricketts the primary aim of simulation is to improve patient safety and to help the student nurse achieve competence, linking their theoretical knowledge with clinical practice (8).

Simulations vary in type and technology utilized. Simulations range in technological complexity from low-fidelity, consisting of case studies or written patient scenarios where students engage in problem-based learning, to high-fidelity, where high-tech mannequins are utilized to generate highly realistic scenarios (3).

Clinical simulation can take a variety of forms including, Written Simulation, Role play simulation, Mediated simulation, Physical simulators and live simulated patients(9).

Written Simulation are pencil and paper presentation of actual problem or case in which the learner must make decisions as if performing a real life situation, Role play simulation allows learner to take on the role of individual involved in clinical situation. Mediated simulation use audio or visual media to present the problem, represent an interpersonal situation or help in analysis of the problem or situation. Physical simulators or anatomical models closely resemble the human body (or part of it), and are often used for developing psychomotor skills. Live simulated patients involve the use of persons trained to act the role of a patient. They are given a specific script to follow while interacting with the learner (9).

Overall the use of clinical simulation in the laboratory setting can facilitate the development of students' skills of inquiry, clinical judgment and decision-making (10).

## **1.2 Statement of the problem**

Newly qualified nurses face difficulty of transferring what they study into their workplace. A cross sectional study done in Ethiopia on 2013 regarding the competency level of newly graduated nurses and midwives found that the average competency level was 51.8%, which shows the newly graduated are not as competent as it is required. Several factors has been identified in studies for this including gaps between school and the clinical workplace, shortage of clinical site ,lack of professional knowledge and skills, lack of confidence in providing independent care; lack of familiarity with medical devices or procedures for machines or tests and responding to ambiguous or unfamiliar orders and diagnoses (3, 11, 12). Another study suggested that there is no guarantee that the clinical studies will provide the students with sufficient opportunities to be exposed to learning situations important for achieving the necessary competency as a nurse (13).

Lack of the required skill by newly qualified nurses may affect the quality of nursing care provided at health care institution, face challenge leading to client dissatisfaction, and could result in greatest treat for the safety of a patient.

With a paradigm shift toward student-centered learning, traditional teaching methods such as lecture and PowerPoint presentations are no longer considered effective for developing student's skill. Nurse educators must develop realistic learning experiences that support student transition to the clinical setting while ensuring safe and competent graduates who are prepared for the technological advances in nursing practice (14).

In Ethiopia, studies that aim to investigate the utilization and application of nursing clinical simulation programs in nursing education have not been found in the literature search. Moreover, even in an international context even though there are a lot of studies aiming toward evaluating the effectiveness of clinical simulation in educating nurses, those that aim to specifically assess the standpoint of nurse educators towards clinical simulation are absent. Therefore, the aim of this study was to assess the knowledge and perception of nurse educators to ward clinical simulation and associated factors with the practice of clinical simulation in nursing.

### **1.3 Significance of the study**

While trying to find studies which are focusing to study about clinical simulation and its effect on nursing education and not succeeding, I realize it would be helpful to study nurse educators' states about this concept. The finding of this study would be helpful for nursing education and policy making.

Studying nurse educators' knowledge and perception toward clinical simulation will show at what level the practice is and the way to increase the practice in Ethiopia. Which in turn will improve the quality of nursing education and patients' safety.

This studies finding could be used by policy makers to develop an appropriate policy and curriculum to improve students' ability in practical area and generally the standard of nursing education and practice.

The finding of this study could also be used as baseline for further study on clinical simulation and the contribution it can provide for nursing profession and nursing education.

## **CHAPTER TWO: LITERATURE REVIEW**

Health care educators are facing great challenges in keeping up with the demands required to prepare graduates for 21st century healthcare practice. Health care environments are complex, and they require high-tech, problem solving, and decision making skills, as well as a strong knowledge background (15).

Nursing is a profession of trust. Patients trust caregivers have skill sets necessary to assist them in their recovery. Therefore teaching methods that increase the ability of the nurse to manage patient care should be used as much as possible in nursing education (16). To design innovative educational systems that meet the needs of the health care delivery system now and in the future the stakeholders which include Nurse educators, students, consumers and nursing service personnel must work in partnership (17).

Nursing educators are in charge for training the future nurses, so they must involve themselves in clinical issues and approximate clinical, educational, and research activities by teaching evidence based practice to students and for them to achieve this they need to have a sufficient knowledge and skill about evidence based practice (18).

Most literature suggest that values held by nursing students throughout their nurse training and later demonstrated in early career stages can be affected to varying degrees by the nurse educators to whom the student is exposed, and the longer a student spends in the academic environment ,in contrast to the clinical area, the closer their values and professional identity mirror those of their teachers (19).

### **2.1 Nurse educators' knowledge toward clinical simulation**

A number of studies show that simulation based education improves the clinical skills and practices of healthcare professionals, for example in a review done by Lapkin et al it notes that simulation improved critical thinking, skills performance, and knowledge of subject matter, which often translate into improved patient care. As reported by Melnyk et al. nurses who believed they were knowledgeable about evidence based practice were more likely to teach evidence based practice to others as compared to those who doesn't. This suggest that any teaching methodology to be effective the nurse educator required to be

knowledgeable about the concept. Thus, nurse educators need to learn and master new instructional skills to implement simulation effectively in clinical teaching (5, 18, 20).

Simulation in undergraduate nursing education is becoming an increasingly effective technique to teach student skills. Literatures has shown that simulation increases students' confidence, skills, quality of care, knowledge, and patient safety (4). A report of a systematic review of 12 literatures from Australia on Simulation-based learning in nurse education found that all 12 studies reported statistical improvements in knowledge/skill, critical thinking ability and/or confidence after the simulation education, indicating that simulation is an effective method of teaching and learning (21).

A study done in Pennsylvania, USA on the effect of HPS(Human Patient Simulator) on students skill of decision making also indicated that students in the simulation groups were significantly more likely to score higher on the clinical decision-making exams and to respond clinically by performing CPR more quickly on the manikin than students in the case study groups (16). Another study done among undergraduate nursing students in Omani on the effect of simulation on undergraduate nursing education showed that majority of the students believe that this teaching method enhance their knowledge and patient safety practices (22).

Even though there are a lot of literature suggesting that clinical simulation is effective ways of teaching in nursing most of the studies failed to show its long term effectiveness which means this students' performance after graduation. The researcher's effort to find a studies done on the effect of clinical simulation teaching method on student's future performance as a nurse professional was fruitless.

The finding of a study done in Kuwait regarding the knowledge of health educators to ward clinical simulation showed that all participants were able to determine the simulator classification, fidelity and possible applications (20).

According to a descriptive survey study conducted at northern California to evaluate Nursing student and faculty perceptions of the characteristics of effective instructors in the simulated clinical experience, both groups rated evaluation as the highest category and nursing competence as the lowest. Students believe the most effective SCE (Simulated

Clinical Experience) instructors demonstrate good communication and clinical judgment, are organized, explain clearly, and enjoy teaching. According to instructors, the most effective SCE instructors provide support and encouragement without criticizing students in front of others, encourage a climate of mutual respect, and are good role models. Both groups also believe providing feedback appears to have greater importance in this risk-free environment (23).

## **2.2 Nurse educators' perception toward clinical simulation**

A study done in USA on the perception of faculty members toward using clinical simulation found three different viewpoints. The first group are positive enthusiasts who believed that simulation had great potential to support learning and, along with supporters, believed it makes learning in the clinical settings much more valuable. While the second group, traditionalists, believed that simulation should be enhanced but not replace clinical experiences. They were also against shorter clinical practice times. The third group was identified as help seekers, they expressed the need for more education for faculty on simulation and a provincial repository of creative simulation applications (24).

There is a debate regarding whether clinical simulation can substitute the time spent at clinical areas. As some studies like a study done in Brazil showed clinical simulation should not be used as a substitution to clinical time rather it should be used as complementary to the time spent at clinical area. Whereas other studies for example a study done in USA states there is strong evidence supporting the use of simulation as a substitute for up to 50% of traditional clinical time and makes a substantial contribution to the literature in both nursing regulation and education (5, 25).

A result of pretest-posttest quasi-experimental non-equivalent control group design study done by Griggs among nursing students at the University of Iowa College of Nursing to compare performance of two groups of students who spent time in clinical practice area and HPS, the students who spent their time at HPS being the experimental group, showed no statistically significant differences in pretest scores of the control and experimental groups, demonstrating comparable groups. In analysis of posttest score and the pretest

and posttest score difference the control group scored significantly higher than the experimental group in both instances(26).

According to studies who evaluated the perceptions of student and instructors about using a HPS in a simulated clinical scenario, all of the instructors believed that the simulation was realistic, tested clinical skills, reinforced course objectives, and was an effective teaching tool. They also reported a positive aspect of HPS such as helping students at all levels with critical thinking, clinical reasoning skills, synthesis of knowledge, and confidence in practicing life-like situations. Instructors reported that implementing the SCE required additional time and resources. The majority of the instructors reported that although the simulator required extra preparation time, they would use it more if additional support were available (7, 26).

In a study done at USA to determine the effectiveness of non-faculty RN (registered nurses) in facilitating simulation exercises , participants agreed that non-faculty registered nurses were helpful (94%) and that they taught in a way suitable to student learning (92%) (27).

A study done in Egypt by Hassona to assess the attitude of nurse educators attitude toward evidence based practice found that the attitude of the nursing educators towards EBP (Evidence Based Practice) was moderate whereas a similar study done in a same country showed a positive attitude towards evidence-based practice was generally found to increase with advancing educational level, academic ranking, years of experience, and teaching and research role (28).

Different barriers that hinders an effort to use clinical simulation by nurse educators are stated by several studies, as reported by Adamson lack of time for preparation and lack of support of faculty to run the clinical simulation scenarios are significant barriers affecting educator use of simulation. Whereas another studies identify several challenges educators face to apply clinical simulation which includes time ,lack of trainers experienced to use it, not applicable/attitude, lack of space and equipment/scheduling the lab, funding, cost of simulation equipment and engaging all students while a few are involved in simulation (29, 30).

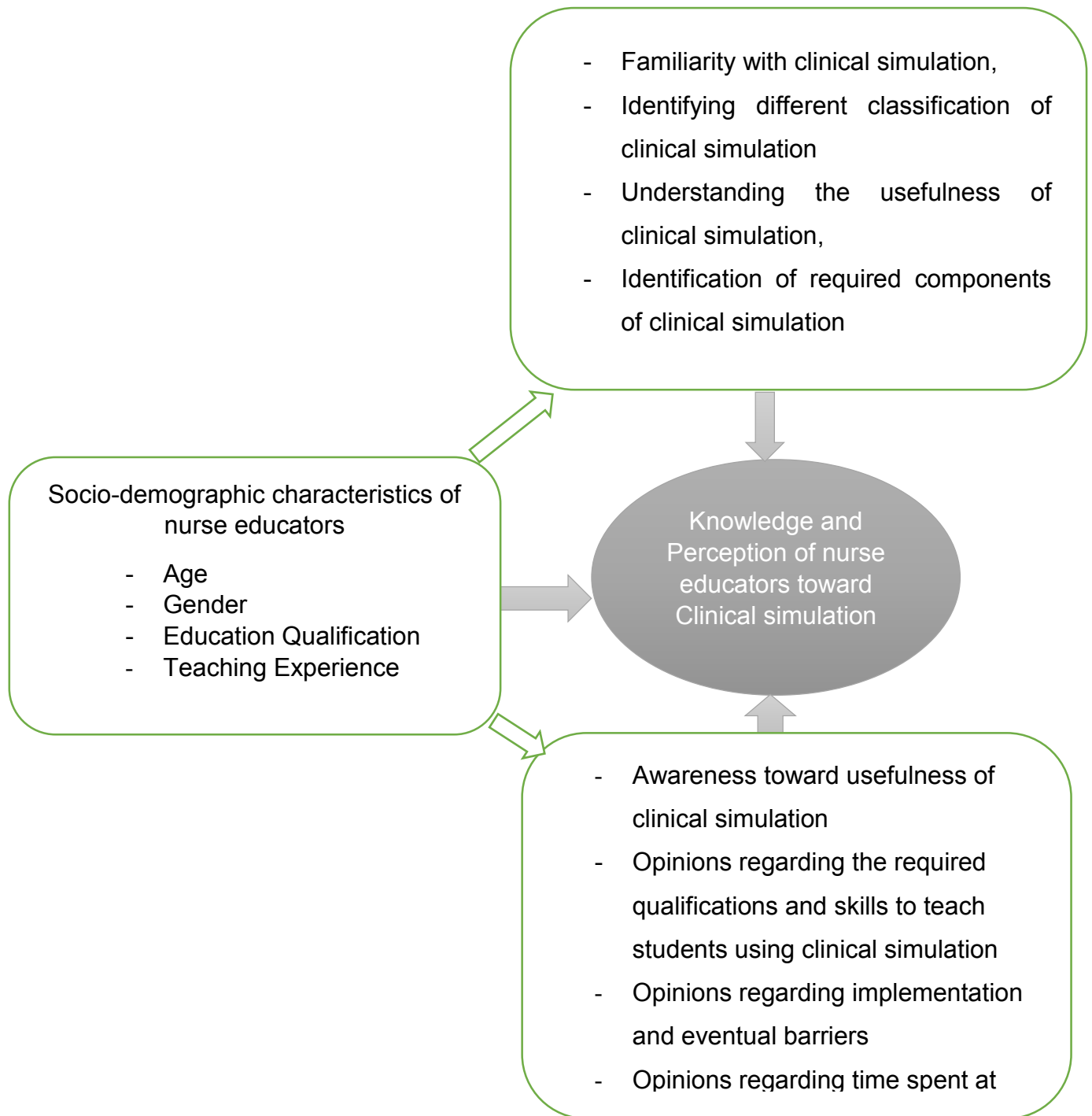
Another factor that is negatively associated with the use of clinical simulation among nurse educators by American Association of Colleges of Nursing (AACN) on 2010 is the age of nurse educators, where it is stated that the mean age of nursing faculty being more than 50 years described as a cause of an anxiety and apprehension about using technology associated with simulation (30).

In Ethiopia there are several efforts done to increase the practice of clinical simulation in health education through the help of different NGOs like JHPIEGO and MEPI-Ethiopia. In one study done at Addis Ababa university to introduce simulation based medical education to clinical educators, it found significance pre/post increases for questions regarding accuracy of simulation practice portrayal of specific clinical conditions but there was no significance change in the attitude of faculty member on the role of simulation practice in grading students (31).

### **2.3 Summary**

After reviewing a number of literatures from PubMed, Health Internetwork Access to Research Initiative (HINARI) and Google Scholar on clinical simulation and its use in nursing education, it is found that most studies reported clinical simulation has a positive effect on nursing students' knowledge, skill and confidence. Literatures suggest different reason to the increase use of this concept in nursing education, lack of clinical areas being the most mentioned reasons. Even with this findings, limited studies are found on nurse educator's perception toward clinical simulation showed there is a divided opinion on its usage in nursing education, as some believe it can be used as a substitute to the time spent at clinical areas and the other group of educators says it should not be used as a substitute rather it should be used as complementary to the time spent at clinical areas. Also nurse educators mention different challenges to apply clinical simulation in nursing education, such as time, finance and availability of resources mentioned as barriers to apply clinical simulation. Even though clinical simulation stated as an effective teaching strategy in a country where there is low resource like Ethiopia, studies regarding clinical simulation and educator's viewpoint toward it is absent.

## 2.4 Conceptual Framework



**Figure 1: Conceptual framework for the determinants of the Knowledge and Attitude of Nurse Educators towards Clinical Simulation developed using a one developed for the determinants of the Knowledge and Perception of Nurse Educators towards Clinical Preceptorship in Addis Ababa, Ethiopia (32)**

## **CHAPTER THREE: OBJECTIVES**

### **3.1 General Objective**

- ✓ To assess the knowledge and perception towards clinical simulation among nurse educators working at teaching institutions in Addis Ababa, Ethiopia.

### **3.2 Specific Objectives**

- ✓ To determine the knowledge towards nursing clinical simulation among nurse educators working at teaching institutions in Addis Ababa, Ethiopia.
- ✓ To determine the perception towards nursing clinical simulation among nurse educators working at teaching institutions in Addis Ababa, Ethiopia.
- ✓ To identify factors associated with nurse educators' knowledge on nursing clinical simulation who are working at teaching institutions in Addis Ababa, Ethiopia.
- ✓ To identify factors associated with nurse educators' perception on nursing clinical simulation who are working at teaching institutions in Addis Ababa, Ethiopia.

## **CHAPTER FOUR: METHODOLOGY**

### **4.1 Study area and period**

The study was carried out from March 03, 2016 to March 30, 2016 in Addis Ababa, Ethiopia. Addis Ababa is the capital of Ethiopia and its estimated population on 2012 was to be 3,048,631. It is further divided into 10 sub cities which are the second administrative units next to city administration. The sub-cities are further divided into 116 woredas, the number of woredas varies based on their size. The city occupies a total area of 540 Sq.Km<sup>2</sup> (33). There are over 150 registered higher education institutions nationwide, from which approximately half of them are found in Addis Ababa (34). For the purpose of this study, only selected nationally accredited health science teaching institutions located in Addis Ababa, which have a bachelor's degree program in Nursing were considered. Hence, seventeen teaching institutions are identified and the educators who works at this institution were the study subjects of the study (35) .

### **4.2 Study design**

An institution-based descriptive cross-sectional study design with mixed quantitative and qualitative approaches was implemented to assess the knowledge and perception of nurse educators towards clinical simulation. This design was chosen because it is a preferable design to assess different factors associated with the study subject at a single point in time due to the time and resource constraints.

### **4.3 Population**

#### **4.3.1 Source Population**

Nurse educators working at teaching institution in Addis Ababa, Ethiopia and nurse students attending class in teaching institution.

#### 4.3.2 Study Population

Nurse educators working at selected teaching institution in Addis Ababa, Ethiopia and nurse students attending class in the selected teaching institution.

### **4.4 Eligibility Criteria**

#### 4.4.1 Inclusion Criteria

- Nurse educators working at teaching institutions and have a teaching experience of at least six months
- Nurse educators whose education qualification is at least bachelor's degree.
- Fourth year nursing students attending class in the selected institution during the study period.

#### 4.4.2 Exclusion Criteria

- Nurse educators who works as part-timer at selected teaching institution

### **4.5 Sample size and Sampling procedure**

#### 4.5.1 Sample Size Calculation

The assumptions used to calculate the actual sample size were: 95% level of confidence with 0.05  $\alpha$  value (which yields  $Z_{\alpha/2} = 1.96$  on the standard normal distribution curve), 5% margin of error, estimated proportion of nurse educators' knowledge and perception towards clinical simulation (50%). With this assumptions using a single population proportion formula:

$$n = \frac{\left(Z \frac{\alpha}{2}\right)^2 p(1-p)}{d^2}$$

Where, n = is sample size

z = the value of the standard normal curve score corresponding to the given  
Confidence interval = 1.96

p = estimated proportion of nurse educators' knowledge and perception towards  
Clinical simulation (50%).

d = the permissible margin of error (the required precision) = 5%

$$n = \frac{(1.96^2)(0.5(1-0.5))}{0.05^2} = 384$$

Since the population is less than 10,000 a correction formula will be used. Therefore, using the correction formula:

$$n = \frac{n_0}{1 + \frac{n_0}{N}} \text{ Where } n_0 \text{ is the initial sample size and } N \text{ is the total population}$$

$$n = \frac{384}{1 + \frac{384}{122}}$$

$$n = 93$$

After adding 10% non-response rate the final sample size was 103.

For the qualitative data three nursing department heads and one college dean who works at the selected health science teaching institution participated in a key informant interview. In addition to this people, students who study at the selected health science teaching institution participated in a focused group discussion. The inclusion of deans, department heads and students in this study aimed to triangulate the data source.

#### 4.5.2 Sampling Procedure and Technique

Nine health science teaching institutions engaged in conducting a degree program in nursing were selected randomly using lottery method among the seventeen teaching institutions found in Addis Ababa. The selected colleges had a total of 122 nurse educators who have an educational qualification of at least a bachelor's degree. Using a proportion technique, the calculated sample was allocated to the seven colleges.

Addis Ababa Medical University College =  $(3/122) * 103 = 3$

Addis Ababa University =  $(44/122) * 103 = 37$

Alkan Health Science College =  $(4/122) * 103 = 4$

Ayer-Tena Health Sciences College =  $(2/122) * 103 = 2$

Keamed Health Science College =  $(4/122) * 103 = 4$

Menelik Health Science College =  $(53/122) * 103 = 45$

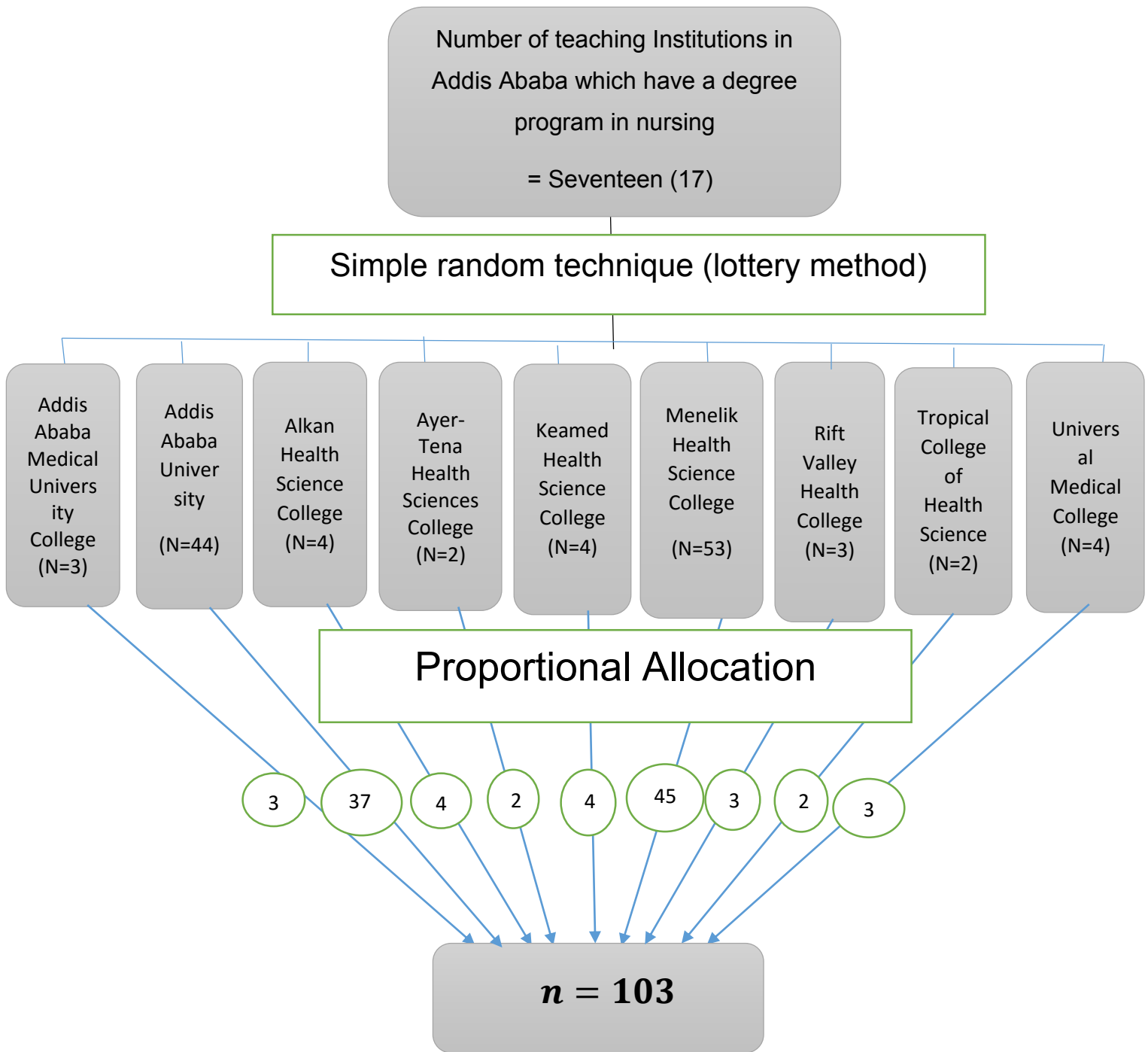
Rift Valley Health College =  $(3/122) * 103 = 3$

Tropical College of Health Science =  $(2/122) * 103 = 2$

Universal Medical College =  $(4/122) * 103 = 3$

Nurse educators who participated in this study were selected randomly using a lottery method among the selected health science teaching institutions located in Addis Ababa.

Deans, department heads and students who participated in the in-depth interview and focused group discussion were selected through a purposive sampling method from the selected health science teaching institution located in Addis Ababa.



**Figure 2: Schematic diagram of sampling procedure**

## 4.6 Variables

### 4.6.1 Dependent Variables

- Knowledge towards nursing clinical simulation

Familiarity with clinical simulation,

Identifying different classification of clinical simulation

Understanding the usefulness of clinical simulation,

Identification of required components of clinical simulation

- Perception towards nursing clinical simulation

Awareness toward usefulness of clinical simulation

Opinions regarding the required qualifications and skills to teach students using clinical simulation

Opinions regarding implementation and eventual barriers

Opinions regarding time spent at clinical simulation and clinical area practice

### 4.6.2 Independent Variables

- Socio-demographic characteristics

Age, Gender, Teaching experience, Educational qualification

## 4.7 Operational Definition

**Knowledgeable:** respondents were considered knowledgeable if they correctly answered more questions than the mean score among the eight questions aimed at assessing knowledge towards clinical simulation in nursing education. Some items contained multiple responses thus, every single response was marked as one question by itself.

**Not-Knowledgeable:** respondents are considered not-knowledgeable if they answered less questions than the mean score among the eight questions aimed at assessing

knowledge towards clinical simulation in nursing education. Some items contained multiple responses thus, every single response was marked as one question by itself.

**Positive Perception:** respondents were said they have positive perception if they scored above the median score of the four questions aimed at assessing perception towards clinical simulation in nursing education.

**Negative Perception:** respondents were said they have a negative perception if they scored below the median score of the four questions aimed at assessing perception towards clinical simulation in nursing education.

#### **4.8 Data Collection Instrument and Technique**

The quantitative data was collected using a self-administered semi-structured questionnaire which is prepared by the principal investigator using different literatures (5, 25, 27, 28,30, 32) in English and designed to meet the study objective. The questionnaire has a three parts: -

Part I contains the socio demographic questions

Part II consist questions assessing nurse educators' knowledge toward clinical simulation

Part III consists questions assessing nurse educators' perception toward clinical simulation.

For the qualitative part which aimed to find the state of principal people from institutions, four questions aimed to inquire adequate information associated with clinical simulation in nursing education was used to guide the key informant interview. The focused group discussions were conducted using three questions aimed to inquire adequate information about clinical simulation from the participant to guide the discussion. Three focused discussions were conducted in which each discussion groups contains eight members.

For quantitative data three data collectors were selected from private colleges and were given trained on the methods of data collection, when to start and end data collection. They hand deliver the questionnaires to the selected nurse educators who were eligible to participate in the study.

For the qualitative data collection, the key informant interviews and focused group discussion was carried out by the principal investigator with intention of maintaining consistency of administration of the points of discussion.

#### **4.9 Data Quality Assurance**

Content validity of the questionnaire was assessed using two experts and meanings of all items has been checked accordingly. Items interpretability and understandability by the study participants was evaluated by pre-testing the questionnaire on 5% of the sample size which is 8, nurse educators working at Adigrat University and necessary correction is taken accordingly. The questionnaire was also provided in the original language of English, avoiding the need for translation and maintaining consistency of the questions and responses. The key informant interview and focused group discussions were conducted in Amharic and translated to English by the principal investigator. With an aim to ensure the validity of the qualitative data multiple data source and peer reviewing was used.

#### **4.10 Data Processing and Analysis**

The collected data was checked for completeness before the analysis process begin. Incomplete data was cleaned and removed. The checked data was coded and entered to Epi-data version 3.1 and then exported to SPSS version 20 for analysis. Descriptive and analytical statistics including univariate and bivariate analysis was employed. Proportion, percentage, ratios, frequency distribution, measure of central tendency and measure of dispersion was used for univariate analysis. Bivariate regression analysis also was used to examine association between dependent and independent variables. This was done using odds ratio and significance of statistical association was tested using 95% confidence interval. And the results were narrated and summarized using texts. The results were also presented using tables and graphs.

The qualitative data was gathered through an in-depth interview and focused group discussion and recorded using a voice recorder. The voice recorded was transcribed and translated to English. Codes were affixed, this codes then sorted and matched to identify

similarities and differences. These codes were then grouped under selected themes based on the questions that aim to assess factors associated with nursing education and clinical simulation and summarized manually. The result was presented in narratives.

#### **4.11 Ethical Consideration**

Ethical clearance was obtained from Ethical Review Committee of Addis Ababa University College of health science institutional review board (IRB). Official letters were received from the department of nursing and midwifery and submitted to the teaching institution which participated in the study. Permission from study settings was obtained. The purposes of the study were explained to participants. Written Informed consent was obtained from participants. Participants' involvement in the study were on voluntary basis and participants were not asked to write their names. Confidentiality was reserved. Individuals who participated in the in-depth interview and focused group discussion were requested to be recorded. Ideas extracted in the literature are acknowledged.

#### **4.12 Dissemination and utilization of results**

The results will be presented and submitted to Addis Ababa University, school of allied health. Soft and hard copy of the result will be submitted to the department. It will also be disseminated to the stakeholders which are concerned with nursing education, curriculum development and quality of nursing education. Also, manuscript(s) will get submitted for publication in peer reviewed scientific journals and results will be presented in scientific conferences for better communication of the results.

## CHAPTER FIVE: RESULTS

### 5.1. Socio-Demographic Characteristics

A total of 103 educators were identified from teaching institutions located in Addis Ababa, Ethiopia. Among these, four did not take part in the study for refusal of participation. This resulted in a final sample size of 99 with a response rate of 96.1%.

Among the 99 respondent 79(79.8%) were government employees and the remaining 20(20.2%) private health science college employees. Most of the respondent in this study were Male 67(67.7%), with the respondents mean age being (32.66±7.791). Furthermore, 22(22.2%) of the respondent hold a bachelor's degree whereas 75(75.8%) hold a master's degree. Of all the 99 nurse educators participated in this study 40(40.4%) reported to have a teaching experience of above 5 years whereas 32(32.3%) reported that they had a teaching experience of 2-5 years (*table 1*).

**Table 1 Socio-demographic characteristics of nurse educators in Addis Ababa, Ethiopia March 2016.**

<b>Variables</b>	<b>Frequency(n=99)</b>	<b>Percentage</b>
Educational institution		
<b>Governmental</b>	79	79.8
<b>Private</b>	20	20.2
Gender		
<b>Male</b>	67	67.7
<b>Female</b>	32	32.3
Educational qualification		
<b>Bachelor’s Degree</b>	22	22.2
<b>Master’s Degree</b>	75	75.8
<b>Doctorate Degree(PhD)</b>	2	2.0
Teaching Experience		
<b>6 months- 1 year</b>	6	6.1
<b>1-2 years</b>	21	21.2
<b>2-5 years</b>	32	32.3
<b>Above 5 years</b>	40	40.4

## **5.2 Nurse educators’ knowledge toward clinical simulation**

Respondents were asked if they were familiar with clinical simulation and 87(87.9%) responded that they were familiar with clinical simulation. Of those said they’re familiar most 62(70.5%) of them mentioned training as the way they get familiar with it followed by reading 24(27.3%) (*Figure 3*). Respondents also asked if they thought they were knowledgeable about clinical simulation and 65 (65.7%) said they are knowledgeable with 22(22.2%) of them said they don’t think they’re knowledgeable.

When asked how clinical simulation can be classified 57(57.57%) of the 77 respondents respond by fidelity whereas 36(36.36%) said by mode of using. The majority of respondents 41(53.2%) think that computerized mannequins are high fidelity type of clinical simulation. In a similar question only 12 (15.6%) of the 77 respondent think case

studies and written case scenarios are low fidelity types of clinical simulation. Of the respondents 36(33.8%) thinks mannequins which can slightly mimic reality are medium fidelity types of clinical simulation.

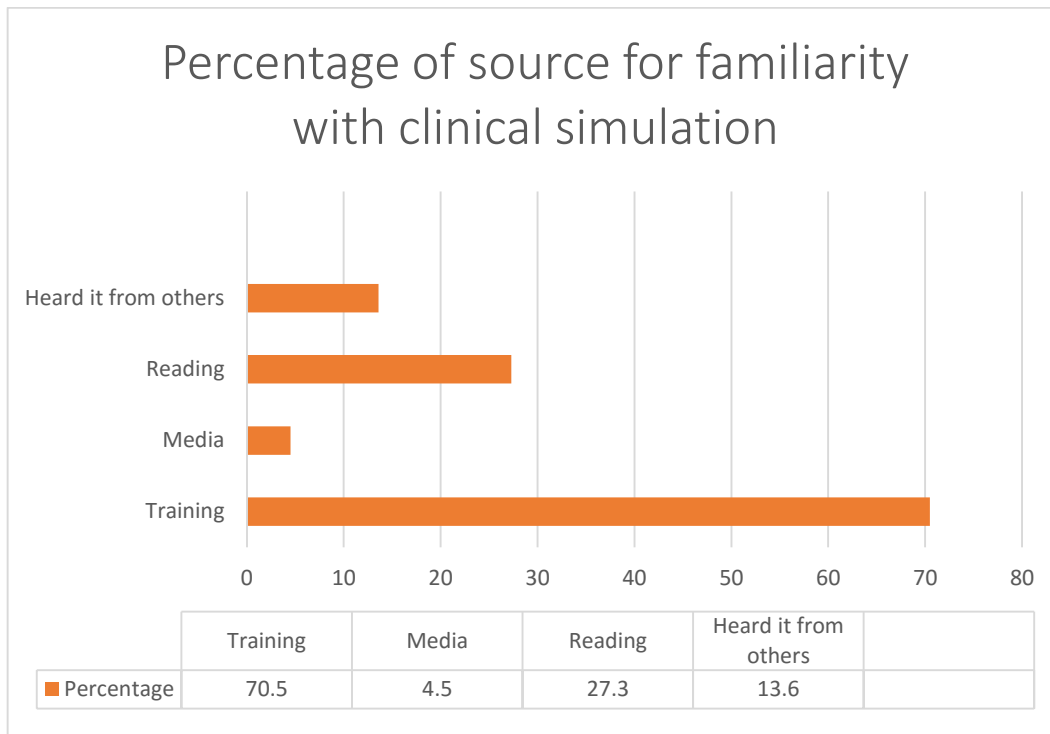
When asked about where clinical simulation sessions take place 62(80.5%) of the 77 respondents responded clinical skill rooms, 35(45.5%) in clinical practice areas and 32(41.6%) of them said in classrooms. On which type of benefits can gain from teaching through clinical simulation most of the respondents 71(92.2%) said students can develop their skills. Most of the participant also responded that clinical simulation is beneficial to improve student's confidence, knowledge, and decision making skill, quality of care and patients safety.

Of the 77 participants' the overwhelming majorities 76(98.7%) answered "yes" for the question asking whether teamwork and communication are essential in simulation similarly 63(81.8%) of the respondent answered "yes" for the question asking if all clinical simulation experiences should include a planned debriefing session. Most of the respondents 69(89.6%) classify clinical simulation as an active form of teaching methodology. (*table 2*).

**Table 2 Knowledge of some basic concepts of clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016.**

Variables	Frequency	Percentage
<b>Familiar with Clinical simulation(n=99)</b>		
Yes	87	87.9
No	11	11.1
I'm not sure	1	1
<b>Knowledgeable about Clinical simulation (n=99)</b>		
Yes	65	65.7
No	22	22.2
I'm not sure	12	12.1
<b>Mode of Clinical simulation classification(n=77) *</b>		
By Fidelity	57	57.57
By mode of using	36	36.36
<b>Computerized mannequins are which type of clinical simulation(n=77)</b>		
High Fidelity	41	53.2
Medium Fidelity	28	36.4
Low Fidelity	8	10.4
<b>Case studies and written patient scenarios are which type of clinical simulation (n=77)</b>		
High Fidelity	28	36.4
Medium Fidelity	37	48.1
Low Fidelity	12	15.6
<b>Mannequins which can slightly mimic reality are which types of clinical simulation (n=77)</b>		
High Fidelity	40	51.9
Medium Fidelity	26	33.8
Low Fidelity	11	14.3
<b>Where do clinical simulation session taken place? (n=77) *</b>		
Clinical practice areas	35	45.5
Clinical skill rooms	62	80.5
Classrooms	32	41.6
<b>All simulation sessions required debriefing sessions? (n=77)</b>		
Yes	63	81.8
No	14	18.2
<b>Clinical Simulation is a form of?</b>		
Active learning	69	89.6
Passive Learning	8	10.4
<b>Communication and teamwork are essential for clinical simulation? (n=77)</b>		
Yes	76	98.7
No	1	1.3

\*multiple response questions



**Figure 3 Source of information about Clinical simulation among Nurse Educators, Addis Ababa, Ethiopia March 2016**

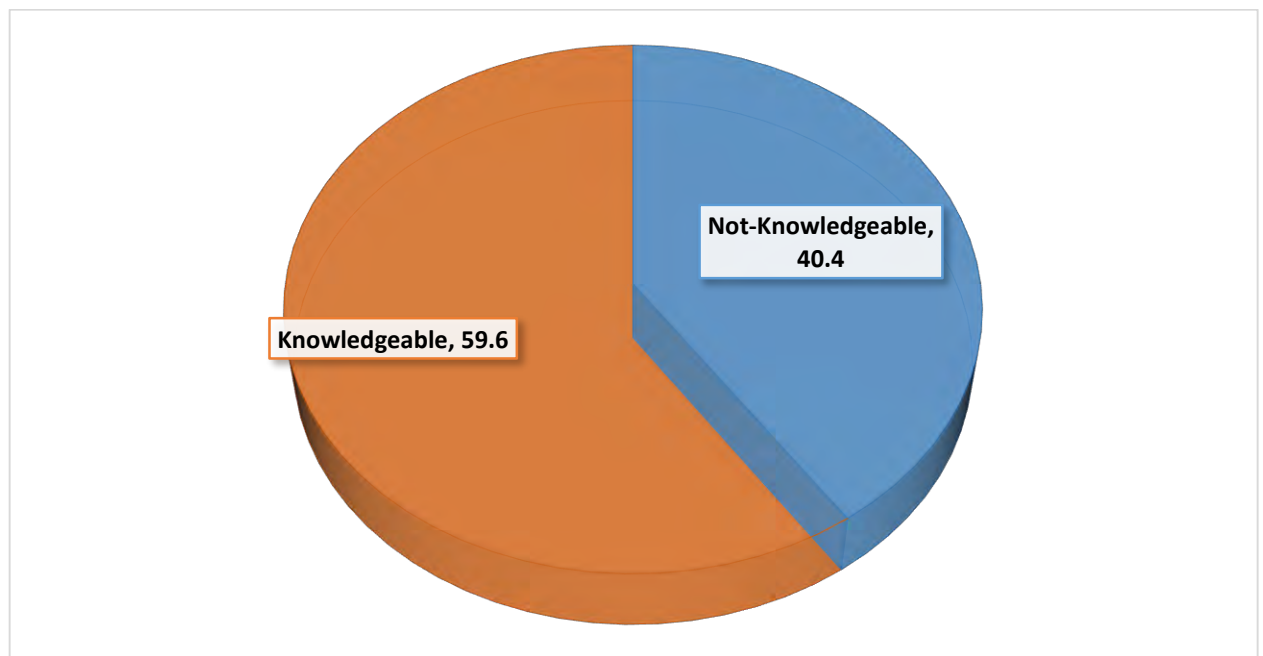
Eleven questions were used to assess the knowledge of nurse educators toward clinical simulation. Scores for each knowledge related question were summarized and the responses categorized into two variables, namely correct and incorrect. Nurse educators who answered the questions that were aimed at assessing knowledge towards clinical simulation correctly were classified in the correct responses category while respondents who gave incorrect or missing answers were classified in the incorrect category. Each response in multiple response questions were count as a single question by themselves and marked out of one.

Based on the correct and incorrect responses each respondent gave, a count was made for each respondent. The aggregate scores of each of the 99 respondents were used to calculate mean, median and other descriptive statistics. Based on these results and the operational definition, respondents who have correctly answered more than the mean among the questions that were aimed at assessing knowledge towards clinical simulation were to be considered as knowledgeable. Thus, out of the 99 respondents 5.14 was the mean score among the 11 knowledge related questions that were asked (table 3).

**Table 3 Correct responses about knowledge towards clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016.**

Score	Frequency of respondent	Percentage of respondent	
0	22	22.2	Mean score= 5.15 Median score= 6.0 Maximum score= 11 Minimum score= 0
4	6	6.1	
5	12	12.1	
6	22	22.2	
7	14	14.1	
8	15	15.2	
9	5	5.1	
10	2	2	
11	1	1	

Based on this, the respondents were categorized as those who are knowledgeable about clinical simulation and those who are not-knowledgeable about clinical simulation. Thus, 59 (59.6%) of the 99 respondents were classified as knowledgeable, whereas the remaining 40 (40.4%) of the respondents were deemed to be not- knowledgeable (*figure 4*).



**Figure 4 Distribution of Knowledgeable and Not-knowledgeable Nurse Educators towards Clinical Simulation, Addis Ababa, Ethiopia March 2016.**

### 5.3 Nurse Educators Perception towards Clinical Simulation

Most of the respondents 83 (83.8%) agreed that clinical simulation improves students' knowledge/skill, critical thinking skill and confidence. From 99 of the participant majority of the respondents 60(60.6%) either agreed and somewhat agreed that there should be a requirement of a minimum of a bachelor's degree for an educator to conduct a clinical simulation session. Most of the educators 80 (80.9%) respond agreed or somewhat agreed with the question whether there should be a minimum set of experience needed to conduct a clinical simulation session or not.

Furthermore, most of the respondents 92(92.5%) either agreed or somewhat agreed that the knowledge gained through clinical simulation can be transferred in real clinical setting. However, when the question whether clinical simulation can replace a real clinical practice setting or not raised 34(34.3%) agreed with the opinion, 27(27.3) of them somewhat agreed and 10(10.1) and 12(12.2%) of the respondents disagreed and somewhat disagreed with the idea respectively.

Likewise, almost half of the respondents disagreed 46(46.5%) with idea there should be an age limit for an instructor to teach through clinical simulation. Fifty-three (53.5%) of the respondents agreed or somewhat agreed that non-faculty nurses can conduct a simulation session whereas 31(31.3%) disagreed or somewhat disagreed with the idea.

Moreover, of all the 99 respondents 89(89.9%) of the respondent respond either agreed or somewhat agreed that clinical simulation can be used as one way to evaluate students.

A multiple response question asking what are the barriers that hinder the application of clinical simulation found that lack of equipment as the frequently selected barrier 85(85.5%) this was followed by cost of simulation equipment 69(69.7%) and lack of space 67(67.7%) (*table 4*).

**Table 4 Perception of nurse educators towards clinical simulation in nursing education in Addis Ababa, Ethiopia, March 2016**

Variables	Frequency(n=99)	Percentage
<b>Students will improve knowledge, critical thinking and confidence after simulation education</b>		
Disagree	1	1
Somewhat Disagree	3	3
Uncertain	1	1
Somewhat Agree	11	11.1
Agree	83	83.8
<b>Instructors needs to hold at least a bachelor’s degree to conduct a clinical simulation session.</b>		
Disagree	14	14.1
Somewhat Disagree	10	10.1
Uncertain	15	15.2
Somewhat Agree	30	30.3
Agree	30	30.3
<b>There should be a minimum set of experience needed to conduct a clinical simulation session</b>		
Disagree	4	4
Somewhat Disagree	4	4
Uncertain	11	11.1
Somewhat Agree	15	15.2
Agree	65	65.7
<b>At least Six months of experiences is needed to conduct a clinical simulation session</b>		
Disagree	10	10.1
Somewhat Disagree	8	8.1
Uncertain	16	16.2
Somewhat Agree	25	25.3
Agree	40	40.4
<b>Knowledge gained by clinical simulation can be transferred into the real clinical setting</b>		
Disagree	1	1
Somewhat Disagree	0	0
Uncertain	6	6.1
Somewhat Agree	21	21.2
Agree	71	71.7
<b>Teaching through clinical simulation can replace real clinical setting</b>		
Disagree	10	10.1
Somewhat Disagree	12	12.1
Uncertain	16	16.2
Somewhat Agree	27	27.3
Agree	34	34.3

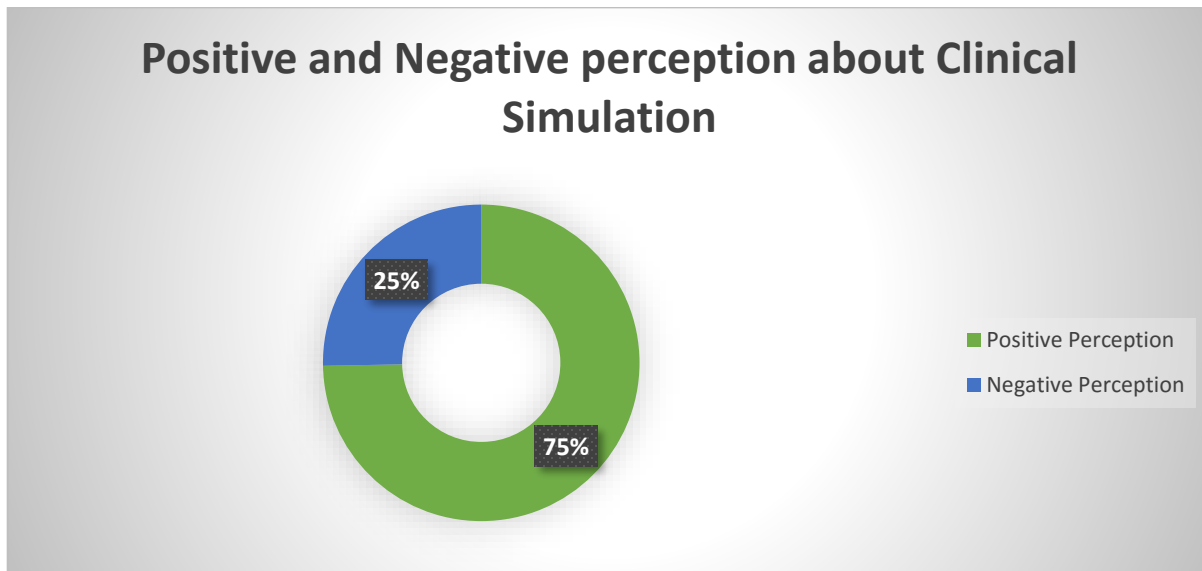
<b>Non-faculty nurses can conduct a clinical simulation session</b>		
Disagree	21	21.2
Somewhat Disagree	10	10.1
Uncertain	25	25.3
Somewhat Agree	26	26.3
Agree	17	17.2
<b>There should be an age limit for an instructor to teach through clinical simulation</b>		
Disagree	46	46.5
Somewhat Disagree	12	12.1
Uncertain	14	14.1
Somewhat Agree	14	14.1
Agree	13	13.1
<b>Clinical simulation can be used as one way to evaluate students</b>		
Disagree	5	5.1
Somewhat Disagree	1	1
Uncertain	4	4
Somewhat Agree	19	19.2
Agree	70	70.7
<b>Barriers that hinder the application of clinical simulation teaching methodology *</b>		
Time spent for preparation	46	46.5
Lack of support by faculty	60	60.6
Lack of training and knowledge	63	63.6
Lack of space	67	67.7
Lack of equipment	85	85.9
Lack of funding	60	60.6
Cost of simulation equipment	69	69.7
Lack of motivation	49	49.5

\* Multiple response question

For the four questions that targeted to assessing educators' perception toward clinical simulation were summarized in to two groups in which responses of agree and somewhat agree grouped into an "agree" group similarly responses of disagree and somewhat disagree grouped into a "disagreed" group. Respondents who scored the median (4.00) and above were grouped as having a positive perception toward clinical simulation (*table 5*). Seventy-four (74.7%) of the respondent found to have a positive perception toward clinical simulation (*figure 5*).

**Table 5 Positive perception towards clinical simulation among nurse educators, Addis Ababa, Ethiopia March 2016.**

No of “agree” response	Frequency of respondent	Percent of respondent	
2.00	3	3.0	Mean = 4.21
3.00	22	22.2	Median = 4.0
4.00	49	49.5	Minimum = 2.0
5.00	2	2.0	Maximum = 7
6.00	22	22.2	
7.00	1	1.0	
Total	99	100.0	



**Figure 5 Positive and negative perception towards Clinical Simulation among Nurse Educators, Addis Ababa, Ethiopia March 2016.**

Linear and multiple logistic regression analysis were carried out, which showed that current educational qualification of nurse educators has a statistically significant association with knowledge towards nursing clinical simulation (with p-value <0.05). However, the institution where they work, age, gender and teaching experience of respondents showed no statistically significant association with knowledge towards nursing clinical simulation.

Regarding the association between participants' current educational qualification and nurse educator's knowledge toward clinical simulation, those who have a bachelor's degree were nine times more likely to be knowledgeable than those who have master's degree with an COR of 3.825 and 95% CI (1.177, 12.43) and an AOR of 9.655 and 95% CI (2.427,38.41) (table 6).

**Table 6 Association for knowledge towards clinical simulation among nurse educators by selected socio demographic characteristics, Addis Ababa, Ethiopia March 2016.**

Characteristics	Knowledge toward clinical simulation		COR (95% CI)	AOR (95% CI)**
	Knowledgeable	Not Knowledgeable		
Educational Institution				
Governmental	48(60.8%)	31(39.2%)	0.640(0.293,2.124)	0.848(0.350,3.585)
Private college	11(55%)	9(45%)	1.00	1.00
Age			0.112(0.989,1.109)	0.278(0.966,1.130)
Sex				
Male	39(58%)	28(42%)	0.684(0.504,2.841)	0.865(0.335,2.505)
Female	20(62.5%)	12(37.5%)	1.00	1.00
Educational qualification				
Bachelor's degree	17(81.0%)	4(19.0%)	<b>3.825(1.177,12.43)*</b>	<b>9.655(2.427,38.41)*</b>
Master's degree	40(52.6%)	36(47.4%)	1.00	1.00
Teaching Experience in years:				
6 months-1 year	3(50%)	3(50%)	0.918(0.179,6.755)	0.346(0.038,3.149)
1-2 years	12(57%)	9(43)	0.888(0.198,6.486)	0.515(0.061,4.072)
2-5 years	16(50%)	16(50%)	0.339(0.411, 13.25)	0.735(0.162,13.161)
Above 5 years	28(70%)	12(30%)	1.000	1.000

\*Significant at p value <0.05 \*\* Adjusted for selected socio-demographic variables

Hosmer and Lemeshow's test= 0.436

Furthermore, the relationship between questions assessing perception of educators toward application of clinical simulation and socio-demographic characteristics was investigated using Pearson product-moment correlation coefficient. There was a positive correlation between respondents' age and educators view whether there should a minimum set of experience by an instructor to conduct a clinical simulation session or not (r=0.245 n=99 p<0.01). However, the likes of gender, participants' educational

qualification and teaching experience showed no statistically significant association with perception of educators toward clinical simulation.

In addition, binary logistic regression was performed to assess association between the independent variables and educators' perception toward clinical simulation. A statistical significance association between institution where educators' work and perception toward clinical simulation was found in binary logistic regression. In which educators' working at private teaching institution were found eight times more likely to have a positive perception toward clinical simulation than those who worked governmental institution at with COR of 8.291 and 95% CI (1.049, 65.524) but failed to show a statistically significant association in multiple regression. Whereas the remaining independent variables failed to show any statistical significant association with perception of educators toward clinical simulation.

**Table 7 Association for perception towards clinical simulation among nurse educators by selected socio demographic characteristics, Addis Ababa, Ethiopia March 2016.**

Characteristics	Perception toward clinical simulation		COR (95% CI)	AOR (95% CI) **
	Positive	Negative		
Educational Institution				
Governmental	55	24	1.00	
Private college	19	1	<b>8.291(1.049,65.524) *</b>	0.054(0.961,69.40)
Age			0.964(0.942,1.059)	0.397(0.954,1.127)
Sex				
Male	51	16	0.650(0.481,3.237)	0.731(0.406,3.610)
Female	23	9	1.000	
Educational qualification				
Bachelor's degree	17	5	0.902(0.347,3.321)	0.957(0.252,4.286)
Master's degree	57	18	1.000	
Teaching Experience in years:				
6 months-1 year	5	1	0.507(0.226,20.352)	0.351(0.219,72.019)
1-2 years	18	3	0.185(0.636,10.395)	0.904(0.083,16.653)
2-5 years	13	9	0.862(0.393,3.053)	0.847(0.048,12.167)
Above 5 years	28	12	1.000	

\*Significant at p value <0.05 \*\* Adjusted for selected socio-demographic variables

Hosmer and Lemeshow's test= 0.394

## **5.5 Qualitative Data Analysis**

As stated on the sampling procedure mixed data collection methods using quantitative and qualitative study designs were implemented. For the qualitative section, the study used key informant interviews with deans and department heads and a focused group discussion with students.

### **5.5.1 Key informant interview findings**

A total of four individuals, one college dean and three department heads participated in the interview. One of the individual was selected from a governmental institution whereas the other three were selected from private colleges. Interviews exceeding four were not considered because of the potential for the redundancy of information and the likelihood of data saturation. Participants are referred to as P1-P4 and each interview was held using a semi-structured interview guideline with probing questions linked to nursing education, with a particular focus on the clinical simulation aspect. Four main themes were identified and these themes of the conversations are used as sub-headings.

#### **Application of Clinical simulation in Ethiopia**

Participants were asked to forward their opinion on clinical simulation and its application in Ethiopia. All participants agreed that a teaching methodology like clinical simulation is very important for a developing country like Ethiopia where the required materials and personnel are limited in clinical practice area. One participant in the interview said:

*P 3 “For developing countries like Ethiopia where clinical practice areas are not well equipped, we need to have a teaching methodology in which we prepare our students for the career they will have in the future and I think clinical simulation is one of them”*

Another participant supported the opinion of P 3 by saying:

*P 1 “... Here in Ethiopia, especially the private colleges struggle to find adequate clinical practice areas where their students develop their clinical skills. Therefore,*

*letting these students practice their clinical skill using clinical simulation is the best option”*

Another participant agreed with the idea that clinical simulation is an important way of teaching students in a country like Ethiopia. However, he also pointed out that the application of clinical simulation methods can prove to be challenging.

*P 2” Applying clinical simulation is very difficult in our situation. One of the main reason for this is that we don’t have well trained individuals with the ability to conduct a clinical simulation teaching methodology”*

Similarly, the other participant raised a similar opinion by saying:

*P 4 “... Even though clinical simulation is a useful type of teaching methodology; I don’t think it is being applied in a right way here in Ethiopia. For example, we as an institution only use a low fidelity type of clinical simulation which reduces the effectiveness of the methodology...”*

### **Can clinical simulation replace the real clinical practice setting?**

Participants have different opinions on whether clinical simulation can replace the real clinical practice setting or not. P2, P3 and P4 raised a similar point regarding this:

*P2 “I don’t think clinical simulation can replace a real clinical practice setting. It can however serve as a way to improve the real clinical practice setting by providing the required equipments and the skilled man power needed for the hospitals and health centers where students went for their clinical practice. I believe we can utilize clinical simulation as a supplement for the clinical practice setting”*

*P3 “My opinion on this is that rather than replacing the clinical practice setting with clinical simulation, it will be much better if we conduct both simultaneously. Because this approach will give the students a chance to transfer the skills they develop in clinical simulation into clinical practice setting easily.”*

*P4 “... I am against the idea of replacing the actual clinical practice settings with clinical simulation. However, letting student develop their skills by using clinical*

*simulation methods before beginning the real clinical practice will help them avoid any difficulty”*

P 1 raised a slightly different opinion than the other participants by saying:

*P1 “In my opinion, clinical simulation can somewhat replace the real clinical practice setting. Real clinical practice settings are overcrowded with students therefore students will not get enough cases to develop their skills in such situations. But I don’t think it can totally replace real clinical practice settings because students sometimes get confused as there is some difference between what they see in clinical simulation and the real clinical practice scenario”*

### **Who should be responsible for clinical simulation sessions?**

One of the topics mentioned by the participants is regarding the responsible body who should undertake clinical simulation sessions. Three of the participants agreed that the person who conducts clinical simulations needs to have an educational qualification of a bachelor’s degree and adequate experience.

*P2 “In our institution the person responsible for the clinical simulation sessions has a bachelor’s degree and that should be the case. Because a person who has a qualification of less than bachelor’s degree might have adequate practical skill but not the required knowledge. Therefore, it is better to hire a person who has a bachelor’s degree for that position.”*

*P4 “A person who has a diploma can conduct a clinical simulation session effectively but having a person who have a bachelor’s degree will increase the quality of the education. But the most important thing for the person to have is an adequate clinical simulation and a clinical practice experiences”*

P3 has a different opinion than the others as he thinks educational qualifications shouldn’t matter to in carrying out clinical simulation sessions.

*P3 “... For me as long as the person has adequate clinical experience, his/her educational qualification should not matter much”*

### **Barriers affect the application of clinical simulation**

Participants mentioned a lot of barriers which affect the application of clinical simulation. A barrier that's mentioned by all of the participants is the lack of materials to carry out the sessions. Lack of trained and qualified personnel is also frequently mentioned.

*P1 "One of the barriers is the lack of adequate space for clinical simulation. The rooms we have are not proportional to the number of students we have. Other than this we also don't have adequate materials and some of the materials we have are not functional."*

*P2 "The main barrier is the unavailability of the required materials. In addition to this, most institutions don't have a skilled man power to use equipments and conduct clinical simulation sessions effectively. The other problem is there is no time that's allocated for clinical simulation in the curriculum. Which makes it difficult for institutions to include a time for clinical simulation and integrate it with the normal learning process"*

*P3 "One of the barriers we face in our institution regarding clinical simulation is the difficulty of transferring what the student has learned through clinical simulation into the real clinical practice setting. This is due to the way health institutions give care, which is not evidence based. The other common barrier is the lack of materials."*

*P4 "The main barrier is the lack of materials. For example, students practice giving an injection directly on patients. However, if we had the required equipments we would let them practice it through clinical simulation. The other barrier is the lack of motivation by some instructors to work through simulation"*

### **5.5.2 Focused group discussion findings**

A total of three focused group discussions were held among students from private colleges, with each group having eight students. On the third group discussion, it was noticed that the discussion isn't generating new opinions and it was decided that this was the point of data saturation. Fourth year students were selected purposively as they have more exposures to the clinical simulation and real clinical practice settings. The focused group discussions are reported as FGD1-FGD3 and the participants are mentioned as

P1-P8 in an attempt to preserve confidentiality. Three main themes were identified from the discussions and these themes are used as subheadings.

### **Clinical simulation is a useful type of teaching methodology**

All group discussions agreed that clinical simulation is a very useful teaching methodology which helps them develop their patient caring skills, improve their confidence and minimize potential risks to the patient. In the group discussions, it is noticed that participants are only familiar with the kind of clinical simulation which is held in demonstration rooms. Participants explained the usefulness of clinical simulation as follows:

*P6 from FGD1 “Learning through clinical simulation made us confident. We all had fears of performing certain procedures on patients, practicing these skills in clinical simulation labs made us confident”*

*P7 from FGD1 “... Clinical simulation will let us see things we learn through theory practically. Additionally, during clinical simulation we can repeat the procedures numerous times, which will help us achieve perfection”*

*P1 from FGD 3 “Clinical simulation is very useful. Without knowing the equipments required to do one procedure, it is very difficult to perform a procedure. Another point is that, practicing skills in a risk free place will help us adapt the real clinical practice environment easily”*

P1 from FGD 2 supported the idea of others but mentioned another perk of clinical simulation by saying:

*“ .... the other benefit of clinical simulation is that it will allow mistakes without consequences and we will eventually learn from those mistakes.”*

P1 from FGD 1 said:

*P1 “... clinical simulation also helps us in getting used to actual situations in the real clinical setting easily, as we would have already seen what we will face during our clinical simulation experiences.”*

## **Who should conduct a clinical simulation session?**

Majority of the participants in each discussion group said they prefer an individual who has the required training in clinical simulation to conduct the sessions. One group of participants raised a point that if an individual is skilled and trained in how to manage clinical simulation teachings, it will help them acquire the necessary knowledge and skills from the clinical simulation.

*P1 from FGD 2 “Everyone has his/her own profession. Therefore, an individual who should be responsible for clinical simulation needs to be a qualified person for the job with adequate training and experience.”*

*P6 from FGD3 “I prefer an individual who is well trained in clinical simulation to handle the sessions.”*

Some participants opposed the opinion of this group.

*P4 from FGD3 “In our institution the person who handles the clinical simulation sessions will vary with the course. But in my opinion, it will be good if the instructor who teach us the theory course also undertakes the clinical simulation sessions”*

P3 from FGD2 supported the idea of P4 and added this

*P3 from FGD2 “One of the problems in the application of clinical simulation is the lack of trained man power in clinical simulation. This is the problem we face in our institution, where the responsible person doesn’t have the required skills. Therefore, I would prefer if the instructor who taught us the theory section also oversees the clinical simulation sessions”*

## **There are problems in institutions on application of clinical simulation**

All focused group discussions raised their concern on how their institutions apply clinical simulation. Most of the participants don’t believe that the institutions utilize clinical simulation effectively. Majority of the participants mentioned lack of materials as the main factor for this issue. Other factors mentioned by the participants include lack of space, imbalance between number of students and the available resources, and lack of skilled man power to manage the sessions.

*P6 from FGD 1 “I don’t think we’re learning through simulation effectively. Due to the lack of materials, we do so many procedures by “assuming” certain parts of the procedures. The second problem is due to different factors, there are procedures we skip inadvertently. Another factor is the imbalance between the number of students and the available equipments which makes it difficult for students to sharpen their skills.”*

*P7 from FGD2 “The most challenging aspect in the demonstration rooms is the lack of materials. The clinical instructor is also not well trained on clinical simulation, which makes it difficult for us to develop the required skills using this methodology”*

P3 from FGD2 agreed with the point raised by P7 and gave his opinion on the solution.

*P3 “... Lack of materials is the main problem in the demonstration room. The other problem mentioned is the presence of an inadequately skilled practical educator. For this problem, I recommend the use of similar educators in both the clinical and class room settings.”*

A slightly different problem has been mentioned in FGD 1 and 3 on the application of clinical simulation. They said:

*P4 from FGD1 “I find it difficult to transfer the skills I gained through clinical simulation into real clinical practice setting. The reason for this is that the procedures we learn in clinical simulation are scientific based whereas the way professionals perform these procedures in real clinical practice areas is using a traditional and conventional way, which makes it difficult for me to perform the skills I develop in clinical simulation in real settings”*

*P2 from FGD1 “I agree with what P4 said. For example, when we learn in the clinical simulation setting, we always implemented sterilization techniques and we also performed all the required steps. On the contrary, in the real clinical practice area they usually don’t perform procedures using this steps.”*

P5 from FGD3 supported this idea by saying;

*P5 "... What we do in the clinical simulation and real clinical practice area do not match. For example, in most hospitals they don't apply sterile techniques strictly."*

*P4 from FGD3 "I don't think the skills gained through clinical simulation can be transferred in real clinical practice areas, because what we usually learn at clinical simulation is what's written in books and internationally stated steps. But you can't do these procedures at hospitals as they prefer to do it in their own way. One of the reasons for this might be our country's economic status. For example, in clinical simulation we can use surgical gloves as we want but in the hospitals, they will not use it as freely because it is expensive. Due to this sort of problems, it is difficult for us to transfer the skills we learned at clinical simulation into real clinical practice settings."*

## CHAPTER SIX: DISCUSSION

The main purpose of this research was to examine the overall knowledge and perception of nurse educators towards clinical simulation. In both the national and international contexts, studies that specifically aim to assess the existing awareness, knowledge or outlook of nurse educators towards clinical simulation were handful. The study has attempted to address this by assessing the level of knowledge and perception towards clinical simulation and identify factors associated with clinical simulation.

The study showed that 87(87.9%) of the 99 respondent claimed that they are familiar with clinical simulation. Of those who claimed they are familiar with clinical simulation 63(63.7%) believe they are knowledgeable. This study later using the operational definition found that 59(59.6%) of the respondents have adequate knowledge about clinical simulation. In another research which has the utmost similarity though being different in what it aimed to assess, a Nigerian study aimed at finding out educators' knowledge and belief towards Evidence-based Practice, found that among 88% of respondents who claimed to have knowledge towards EBP, 65% were later found to be not knowledgeable(28). On this study, it is found that training is the most mentioned way in which respondents got familiar with clinical simulation which suggest that training is a good way to introduce educators to new concept in health education.

Furthermore, this study found a statistically significant association between educators' educational qualifications and educators' knowledge towards clinical simulation. Nurse educators who have bachelor's degree scored better on the knowledge related questions compared to those who have a master's degree with an COR of 3.85 and 95% CI (1.177, 12.43). This might be due to those who have a bachelor's degree are usually new graduates and the closeness of them to new concepts in teaching. Additionally, they are the closest to technologies like internet, where they can get familiar with new concepts.

Moreover, this study found that only 57(57.7%) of the participants were able to determine clinical simulation classifications by fidelity. This is significantly lower than a finding of a similar study done in Kuwait regarding the knowledge of health educators towards clinical simulation which showed that all participants were able to determine the simulator

classification, fidelity and possible applications(20). The lower level of knowledge regarding this matters, as evidenced by the results of this study might be due to difference between two countries in the availability of resources and technologies as well as difference in methods of teaching.

Majority of the educators (80%) participated in this study reported that clinical simulation sessions takes place only at clinical skill rooms with only 45.5% and 41.6 % reported it also take place in clinical practice areas and classrooms respectively. This is also supported by students who participated in the focused group discussion where it was evident that students believed clinical simulation sessions take place only in demonstration rooms. This suggests that there is a misconception among educators and students regarding where clinical simulation sessions take place.

This study showed that educators believe clinical simulation is beneficiary to students develop their skills, confidence, knowledge, decision making skills, quality of care and patient's safety. This finding is in line with a literature review done in USA which showed that simulation increases students' confidence, skills, quality of care, knowledge, and patient safety(4). Likewise, overwhelming majority (92.9%) of educators either 'agreed' or 'somewhat agreed' that knowledge gained through clinical simulation can be transferred in to real clinical practice setting. However, as evidenced by the focused group discussions students believe that due to procedures performed at health institutions not being as per international protocol they found transferring the knowledge they gained through clinical simulation into real clinical practice setting difficult.

Additionally, this study also showed that 74(74.7%) of the educators have a positive perception toward clinical simulation. However, there was no statistically significant association with participants age, sex, educational qualifications and teaching experience. In contrary, a similar study done among nurse educators attitude towards EBP in Egypt found that educators have an increased positive attitude with advancing educational level, academic ranking, years of experience and teaching and researcher role(28).

In this study almost all participants 95(94.9%) perceived that clinical simulation will improve the student's knowledge, critical thinking and confidence. This finding is consistent with the one done in Pennsylvania, USA where students in simulation groups

scored higher on the clinical decision making skills compared to students in the case study groups. Similarly, a study done among Omani students where students believe that clinical simulation enhance their knowledge and patient safety practice(16, 22). This suggest that educators in this study have a positive perception toward clinical simulation but lack the required knowledge and equipment hinder the application of clinical simulations.

Furthermore, this study reports that two-thirds of the educators agreed that a minimum set of experience should be required by an instructor to conduct a clinical simulation session which is also supported by individuals participated in the in-depth interview and focused group discussion.

Almost half of the educators in this study disagreed with the idea that there should be an age limit for an instructor to teach through clinical simulation. This finding is incoherent with what the AACN found, which stated the mean age of nursing faculty being more than 50 years described as a cause of an anxiety and apprehension about using technology associated with simulation(30).

Among the educators, only about half of them believed non-faculty nurses can conduct a clinical simulation session. In contrary to this, a study done in the USA with the purpose of determining the effectiveness non-faculty nurses in facilitating simulation exercises found that 94% of the respondents agreed that non-faculty nurses are helpful while most of the participants (92%) believed that they taught in a way that was suitable to the students(27).

In accordance with this study, different studies have found that support of faculty to run clinical simulations, lack of equipment and space, cost of simulation equipment as common barriers affecting educators use of clinical simulation(29, 30). This is also agreed by principal personnel's who participated in key informant interviews and students who participated in focused group discussions, who mentioned lack of materials as the main barriers for the application of clinical simulation. This implies that to improve the use of clinical simulations stakeholders in nursing education need to make the necessary equipment available for the teaching institutions.

As it was learnt from the key informant interviews the majority of the participants agreed that clinical simulation should not replace the real clinical setting practice. However, they recommended that the two should be integrated. This is also supported by the study done in Brazil where it is recommended that clinical simulations should be used as a complementary teaching mechanism for clinical practice, rather than utilizing it as a replacement for actual time spent in the clinical practice setting (5). In contrary to this about two-third of respondents in this study reported that they either 'agreed' or 'somewhat agree' with clinical simulation replacing a real clinical practice setting. Similarly with this faculty members in Tucson, Arizona suggested that innovative simulation experiences may replace some patient care experience(7). This suggests that a further research needs to be done to evaluate the proper integration of clinical simulation with the conventional clinical practice teaching of students.

Additionally, this study reported that three-fourth of participants agreed that skills gained through clinical simulation can be transferred into real clinical setting. This is supported by students participated in the focused group discussion in which they stated that clinical simulation makes them ready for what they will face in real clinical practice areas. This is in-line with a study done in Indiana, USA where faculty members reported that clinical simulation experience prepared students to perform in real clinical setting (7).

# **CHAPTER SEVEN: STRENGTH AND LIMITATION OF THE STUDY**

## **7.1 Strength of the study**

The main strength of this study is that it is a pioneer study in which it tries to find the state of nurse educators' knowledge and perception toward clinical simulation in teaching undergraduate nursing students. The study used a mixed approaches of quantitative and qualitative methods of data collection; and it also involved teachers and students. The findings of this study can be used as a base line data for further studies on clinical simulation.

## **7.2 Limitation of the study**

The limitation of this study includes small sample size, the study design is cross-sectional (snap shot) and its questionnaire which is used to collect the quantitative data as it is prepared by the principal investigator it might limit the reliability of finding of this study. Furthermore, the lack of adequate literatures relevant to the study may limit to draw conclusion outside the context of the study settings

## **CHAPTER EIGHT: CONCLUSION**

Based on the findings of this study it can be concluded that the majority of nurse educators were knowledgeable about clinical simulation in nursing education. Additionally, most of the educators were found to have a positive perception towards clinical simulation. It was also noticed that knowledge towards clinical simulation tends to get better among those who have a bachelor's degree rather than those who possess a master's degree. Students, deans and department heads all mentioned that they preferred a trained and skilled personnel who can undertake the teaching and mentoring roles in clinical simulations. Lack of materials was mentioned as the main challenge for the successful application of clinical simulation in nursing education

## **CHAPTER NINE: RECOMMENDATION**

- Teaching institution needs to provide additional training to their staffs to advance their knowledge and promote using new teaching methodologies and assign a well-trained individual to the responsibility of managing clinical simulation.
- Responsible governmental bodies (MoE, HERQA and MoH) with quality of nursing education, policy development and quality of nursing care needs to give a special attention toward improving the quality of both nursing education and nursing care given at health institution by preparing a standardized guideline.
- Further studies on the application and related matters of clinical simulation needs to be done to evaluate the state of the practice in the country.
- Teaching institutions and responsible government bodies (MoE and HERQA) have to equip the clinical skill rooms in nursing teaching institutions with functional and advanced equipment.

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## APPENDIX I: INFORMATION SHEET AND CONSENT FORM

### **Information Sheet**

**Title of Research:** Knowledge and perception towards clinical simulation in teaching undergraduate nursing students among Nurse Educators working at teaching institution in Addis Ababa, Ethiopia

**Institution:** Addis Ababa University, College of Health Sciences, School of Allied Health Sciences, Department of Nursing and Midwifery.

**Name of principal investigator:** Mintesnot Tenkir Mobile- +251913890414

**Advisor:** Mr. Tigistu Gebreyohannis (BSc, MSc)

**Purpose and benefits of the study:** The aim of this study is to assess knowledge and perception of nurse educators' working at teaching institutions toward clinical simulation in teaching undergraduate students. The finding of this study will be helpful for nursing education and policy making.

**Voluntary participation:** Your participation is voluntary and you have the right to participate or decline participation. There are no costs to you for participating in this study, other than the time you will spend on answering the questionnaire. You will not gain any personal benefit or money from your participation in this study. However, your participation in the study will contribute very much to the effort to scale up nursing education.

**Confidentiality and Risks:** The information you provide will be kept confidential and I will ensure that your name is not connected to the information you provide. It will not be reporting on how individuals responded to the questions. You are also not required to offer personal information about yourself.

**Are you willing to Participate in this study?** If your response is yes, place your signature in the space below and please continue to the next page.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX II: QUESTIONNAIRE

**General instructions:** this questionnaire was developed to assess the knowledge and perception towards nursing clinical simulation among nurse educators working in health science teaching institution in Addis Ababa, Ethiopia. The questionnaire has three parts, each asking questions regarding socio-demographic characteristics, knowledge and perception related to nursing clinical simulation. Please read the instructions and questions carefully before preceding to answering the questions.

### Part I: Questions assessing Socio Demographic characteristics of respondents

**Instructions:** Please encircle the number in front of the option you choose. If you are asked to write a response, please do in the blank space provided.

No	Question	Responses and codes	Skip
101	What is the name of the Educational Institute/College you're working at?	_____	
102	How old are you?	_____	
103	Gender	1. Male 2. Female	
104	What is your current educational qualification?	1. Bachelor's Degree 2. Master's Degree 3. Doctorate Degree (PhD) 4. Other (Specify)_____	
105	How many years of experience do you have as a teacher at college level?	1. 6 months- 1 year 2. 1-2 years 3. 2-5 years 4. Above 5 years	

**Part II: Questions assessing nurse educators' knowledge toward clinical simulation**

**Instructions:** Please encircle the number in front of the option you choose. If you want to write a response instead of choosing among the alternatives, please do in the blank space provided. If you are asked to “encircle all the possible response” you can provide more than one answer to the question. If there is a ‘skip to’ option on ‘skip’ column, you can jump straight to the question number indicated.

No	Questions	Responses and codes	Skip to
201	Are you familiar with clinical simulation in nursing education?	1. Yes 2. No $\longrightarrow$ 3. I'm not sure	Q. no.203
202	Where did you hear about clinical simulation? (Encircle all the possible responses)	1. Trainings 2. Media 3. Reading 4. Heard it when others people talking 5. Other (Specify)_____	
203	Do you believe you're knowledgeable about Clinical simulation?	1. Yes 2. No $\longrightarrow$ 3. I'm not sure	Part III
204	How could you classify clinical simulation? (Encircle all the possible responses)	1. By fidelity 2. By mode of using 3. Other (Specify)_____	
206	Computerized mannequins are which kind of clinical simulation?	1. High Fidelity 2. Medium fidelity 3. Low fidelity	
206	Case studies and written patient scenarios are which kind of clinical simulation?	1. High Fidelity 2. Medium fidelity 3. Low fidelity	

207	Mannequins which have devices to mimic reality are which kind of clinical simulation?	<ol style="list-style-type: none"> <li>1. High Fidelity</li> <li>2. Medium fidelity</li> <li>3. Low fidelity</li> </ol>	
208	Where do clinical simulation sessions taken place? (Encircle all the possible answers)	<ol style="list-style-type: none"> <li>1. Clinical practice areas</li> <li>2. Clinical skill rooms</li> <li>3. Classrooms</li> <li>4. Other (Specify)_____</li> </ol>	
209	Which of the following among listed do you think is/are benefit of teaching through clinical simulation (Encircle all the possible answers)	<ol style="list-style-type: none"> <li>1. Student's confidence,</li> <li>2. Student's skill,</li> <li>3. Quality of care,</li> <li>4. Knowledge</li> <li>5. Patient safety</li> <li>6. Decision making skill</li> <li>7. Other (Specify)_____</li> </ol>	
210	All simulation experiences should include a planned debriefing session?	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. I don't know</li> </ol>	
211	Is Clinical Simulation a form of?	<ol style="list-style-type: none"> <li>1. Active learning</li> <li>2. passive learning</li> <li>3. Other (Specify)_____</li> </ol>	
212	In simulation, teamwork and communication are essential to handling the situation presented.	<ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. I don't know</li> </ol>	

**Part III: Questions assessing nurse educators' perception toward clinical simulation**

**Instructions:** Please put ✓ in the space provided for the option you choose.

No	Questions	Disagree	Somewhat Disagree	Uncertain	Somewhat Agree	Agree
		1	2	3	4	5
301	Students will improve in knowledge/skill, critical thinking ability and confidence after simulation education.					
302	An instructor to teach students using clinical simulation needs to hold at least a bachelor's degree.					
303	There should be a minimum set of experience is needed to teach through simulation.					
304	A minimum set of experience of at least six months is needed to teach through simulation.					
305	Knowledge gained by Students from clinical simulation can be transferred to the clinical setting.					
306	Teaching through clinical simulation can replace real situations in clinical areas?					
307	Non-faculty nurses can conduct a clinical simulation session?					
308	There should be an age limit for an instructor to teach through clinical simulation.					
309	Clinical simulation can be used as one way to evaluate students.					

**Instructions:** Please encircle the number in front of the option you choose. If you are asked to “encircle all the possible response” you can provide more than one answer to the question.

<b>310</b>	Which barriers in your institution do you think is/are barriers that hinder clinical simulation? (Encircle all the possible responses)	<ol style="list-style-type: none"><li>1. Time spent for preparation</li><li>2. Lack of support by faculty</li><li>3. Lack of training &amp; knowledge</li><li>4. Lack of space</li><li>5. Lack of equipment</li><li>6. Lack of funding</li><li>7. Cost of simulation equipment</li><li>8. Lack of motivation</li><li>9. Other(Specify)_____</li></ol>
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**Thank you!!**

### APPENDIX III: KEY INFORMANT INTERVIEW GUIDELINES

Good Morning/Afternoon, I am Mintesnot Tenkir and I am a postgraduate student at Addis Ababa University, Department of Nursing and Midwifery. I am conducting a research focused on assessing the knowledge and perception towards nursing clinical simulation among nurse educators working in health science teaching institutions located in Addis Ababa, Ethiopia. This particular interview aims to identify factors associated with nursing clinical simulation among nurse educators or individuals concerned with nursing education working in teaching institutions in Addis Ababa. If it is okay with you, I will be recording our conversation. The purpose of this is so I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential and no reference to individuals will be made during the compilation of the interviews. The interview will take approximately 15 to 20 minutes of your time and you are free to provide your responses in either Amharic or English.

If you agree to this interview, please sign this consent form.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Questions:

1. What's your view on clinical simulation and its application?
2. Do you think it can replace the time spent at real clinical setting?
3. Does your institution use clinical simulation as a teaching method? If yes which types of clinical simulation technique are used in your institution?
4. What do you think are the challenges to use clinical simulation?

#### APPENDIX IV: FOCUSED GROUP DISCUSSION GUIDELINES

Good Morning/Afternoon, I am Mintesnot Tenkir and I am a postgraduate student at Addis Ababa University, Department of Nursing and Midwifery. I am conducting a research focused on assessing the knowledge and perception towards nursing clinical simulation among nurse educators working in health science teaching institutions in Addis Ababa, Ethiopia. This particular discussion aims to identify factors associated with nursing clinical simulation among nurse students studying in teaching institutions located in Addis Ababa. If it is okay with you, I will be recording our discussion. The purpose of this is so I can get all the details but at the same time be able to carry on a useful discussion. I assure you that all your comments will remain confidential and no reference to individuals will be made during the compilation of the discussion. The discussion will take approximately 20 to 25 minutes of your time and you are free to provide your responses in either Amharic or English.

If you agree to this discussion, please sign this consent form.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Questions:

1. Are you familiar with learning through clinical simulation?
2. Does the institution that you're attending class use clinical simulation as teaching methodology?
3. What are your views about clinical simulation and its application?

## DECLARATION

I, the undersigned, declare that this is my original work and has never been presented in this or any other University and that all the source materials used for this thesis have been duly acknowledged;

Name: Mintesnot Tenkir Teni

Signature: \_\_\_\_\_

Date of Submission: \_\_\_\_\_

The thesis has been submitted for examination with my approval as a university advisor.

Name: Mr. Tigistu Gebreyohannis (BSc, MSc)

Signature: \_\_\_\_\_

Date: \_\_\_\_\_