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Satisfaction with Simulation Based Learning and Associated factors Among Public Health Science College Students, Amhara, Ethiopia, 2021

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BAHIR DAR UNIVERSITY

COLLEGE OF MEDICINE AND HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF HEALTH SYSTEM PROJECT

MANAGEMENT AND HEALTH ECONOMICS

**SATISFACTION WITH SIMULATION BASED LEARNING AND
ASSOCIATED FACTORS AMONG PUBLIC HEALTH SCIENCE
COLLEGE STUDENTS, AMHARA, ETHIOPIA, 2021**

BY ALEBACHEW ABAT (BSC)

**A THESIS TO BE SUBMITTED TO DEPARTMENT OF HEALTH
SYSTEM PROJECT MANAGMENT AND HEALTH ECONOMICS,
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SYSTEM AND PROJECT MANAGMENT**

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ACRONYM AND ABBREVIATIONS

AOR	Adjusted Odds Ratio
BDU	Bahir Dar University
CI	Confidence Interval
COR	Crude odds ratio
Dr.	Doctor
FTVET	Federal technical vocational education and training agency
HFS	High Fidelity Simulation
HSC	Health Science College
HICs	High Income Countries
IQR	Inter quartile range
IRB	Institution Review Board
LMIs	Low middle Income Countries
SBL	Simulation Based Learning
SBE	Simulation Based Education
SPSS	Social package statistical soft ware
TVET	Technical Vocational Education Training
USA	United States of America

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ABSTRACT

Background: Simulation based learning is a highly successful teaching and learning method. However, it is underutilized or ineffectively offered in low and middle income country. There is paucity of evidence on satisfaction related to simulation based learning among level based public health science college students in Ethiopia.

Objective: To assess level of satisfaction with simulation based learning and associated factors among level based public health science college students, Amhara, Ethiopia, 2021.

Methods: Institution based cross sectional study was employed from September 6th up to October 6th, 2021 in public health science colleges in Amhara region among 422 level based under graduate health science students. The participants were selected by systematic random sampling technique. Self-administered questionnaire was employed. Data were coded, entered and cleaned using Epi-data version 4.2 package and exported to Social package statistical software version 25 for analysis. Binary logistic regression analysis was computed to assess satisfaction with simulation based learning and associated factors. Adjusted Odds ratio with its 95% Confidence interval was reported and P- value < 0.05 was considered as statistically significant.

Results

Proportion of students' satisfaction with simulation based learning was 188 (45.6%). Students perceived presence of active learning (AOR =2.9, 95% CI=1.69-5.0), collaboration (AOR=2.09, 95% CI=1.17-3.73), objective (AOR=2.25, 95%CI=1.31-3.86) and presence of problem solving (AOR=2.65, 95%CI=1.47-4.76) were significantly associated to satisfaction with simulation based learning.

Conclusion and recommendations

The overall proportion of satisfaction with simulation based learning was low. Presence of active learning, collaboration, problem solving and clear objective were significantly associated with satisfaction of simulation based learning. The study recommended shall to strengthen simulation based learning practice

Key words: Satisfaction, simulation based learning, level based

1. INTRODUCTION

1.1 Background

Simulation based learning (SBL) is a method of teaching and learning for substituting real-life experiences (1). It is a successful method for teaching learning processes, for a variety of technical and nontechnical skills (2). Globally, simulation-based learning practice has increased and is widespread (3, 4). In the United States, simulation is quickly becoming instructional pedagogy for undergraduate clinical students (5).

Simulations classified as role-playing, standardized patient simulations, manikins (human model) and computer simulations (6). Simulation based learning (SBL) gives an advantage for students in development of self-evaluation, time management, teamwork, clinical decision-making and communication skills for patient safety and care (6, 7). It also allows students to practice procedures and become familiar with clinical situations (8).

Student satisfaction is vital in medical education because it influences teaching and learning processes, as well as the use of simulation-based learning strategies (9). In the middle east and north Africa, it was indicated that a high level of satisfaction with simulation based learning (10). But high satisfaction with the simulated practice does not always convert to strong clinical performance (11). Because of simulation based learning practice had many impeding (challenging) factors in Middle East and low income countries (12, 13).

Ethiopia's health workforce, requires ongoing skill development to accomplish long-term development goals and universal health coverage (14), to accomplish this simulation centers in different teaching hospitals have been established with long standing international collaboration of stakeholders but utilization of SBL in Ethiopia was not reported and innovative in various medical education field specialities (15-17).

1.2 Statement of the problem

Globally, Simulation based learning was escalated and medical education has changed dramatically over the world from traditional lecturing towards technology supported SBL (18). Despite that fresh graduates lack technical and non-technical skills in health institutions worldwide(19).In USA all graduates experience indicated theory-practice gap on their shift to clinical practice(20). In Ireland a research reported among the students 55% are poor in 3 or more skills (21).

In lower middle income countries (LMICs) since simulation based learning is underutilized (13, 22). For example, in Cameroon simulation based learning practice had constraints in which hospital patients used for clinical practice before students exposed to simulation(23). Moreover like Tanzania and Kenya simulation based learning as pedagogical instruction little implemented(24) .In Kenya a research stated challenges arise due to unfamiliarity of SBL(25)

Like to other sub-Saharan countries, Ethiopia lacks sufficiently skilled health professionals (26).For example a study done in Ethiopia stated that the overall level of competency in pre service education among midwives students was low (51.8%) (27).Similarly other study done in Ethiopia among nurse students their level of clinical competency was low(48.7%) (28). Moreover, other study conducted in Mettu university, Ethiopia students achieved low level of clinical practice competency which was 24.5%(29).In Ethiopia SBL is relatively new, less considered and usage of strategies(16, 30) ,little studies revealed under graduate midwifery students had lower satisfaction than other regions(31, 32).

Factors affecting simulation-based education include students' school years, desired learning styles, perceived degrees of assistance, problem-solving possibilities, perceived degrees of fidelity, participant experience, work shop design, time

constraint, teachers knowledge and training, Equipment and number of students (33-37). In order to analyze factors associated with simulation based learning, national league for nurse/Jeffries in 2005 and 2007 developed Simulation Framework/model to define variables as participant (example: program, age, level), facilitator (example: demographics), educational practice (example: active learning, feedback, interaction), simulation design (example: objectives, problem solving, student support) and outcome variable (example: learner satisfaction) (38).

Solutions designed for SBL practice challenges were improvisational equipment, low-cost simulation software adaptation, context-specific curricula design, local administrative support, and the formation of a simulation fellowship opportunity for local educators (22). In other studies indicated solutions were improving educational learning environment, use of pre briefing and debriefing as strategy (12, 27)

From observation, quarterly and annually college reports(39) about student's low level of competency, simulation based learning and hindering factors were raised problems. There is paucity of evidence on satisfaction related to simulation based learning among level based public health science college students in Ethiopia. Moreover organizational factors related to satisfaction with simulation based learning included in this study were not studied in Ethiopia. Therefore, the aim of present study is to assess student satisfaction with simulation -based learning and associated factors among level based public health science college students in Amhara region.

1.3 Significance of the study

It will be important for Amhara Technical and vocational education training institute and Amhara regional health bureau to develop intervention strategies on simulation based learning. It will be useful for Amhara public health science colleges to design strategies, revise teaching curriculum and training. It will be useful for college health professional teachers to see themselves, how to give simulation based learning and improved their status. Moreover it will contribute for teachers components of simulation based learning as pedagogical instruction and will help to identify barriers to deliver simulation based learning. It will be useful for students to prepare for clinical practice and active learning and also it will be a useful evidence for nongovernmental organizations involved in supporting education sectors. It will be used as an input for future researchers.

2. Literature review

2.1 Satisfaction with simulation based learning

In High income countries (HICs) students had high level of satisfaction with simulation based learning (5, 40, 41) but in low income countries most students were dissatisfied because evaluated and learned with traditional teaching learning methods (22) . A study carried out in Australia indicated that high level of satisfaction with SBL using high fidelity simulation (42). Similarly, a study conducted in north Italy , satisfaction using static mannequins and using high-fidelity simulators were 71% and 60% respectively but teaching with clinical cases received lower level of satisfaction (38%)(43).

According to studies conducted in USA and Norway reported high level of satisfaction with simulation experience which was 4.36 & 4.57 mean value (44, 45). But in south eastern USA , senior students were dissatisfied (46)..According to the study of Singapore, there was a significant difference in student satisfaction before and after the use of standardized patient simulation in which standardized patient enhanced student satisfaction with their learning (47).

Across sectional study conducted in Saudi Arabia and Palestine proportion of satisfaction under graduate students were 85%, 97.8% and 80.7% respectively (35, 48, 49) . According to study carried out in Turkey, reported that 94.4% of students were very satisfied with low fidelity simulation, 3.7% of them were moderately satisfied and 1.9 percent of respondents were dissatisfied (50) Another study in Chile found that 70% and 60% of 4th and 5th year students were satisfied with their practice respectively.(51).

According to the studies done in Egypt, more than half of nursing students (59%) had a moderate degree of clinical simulation satisfaction (52, 53). In Ethiopia , Harar and Dire Dawa university, the study reported that proportion of satisfaction with SBL was 70.98%

(32) and the similar study conducted in Gondar, Ethiopia their level of satisfaction with SBL was 54.2%(31).

2.2 Factors associated with simulation based learning practice

2.2.3 Socio demographic characteristics

According to the studies in Palestine and Saudi Arabia, level of education is a factor significantly associated with satisfaction for SBL practice (49, 54).The study conducted in north- central Saudi Arabia stated students' satisfaction score decreased when their year level increased (55). in contrast to this the study carried out in Saudi Arabia, fourth year nurse students had higher satisfaction, educational practice& simulation design scores than third year students(56).But the studies done in Riyadh, Saudi Arabia and Salem university(USA) level of education had no significant association with satisfaction of SBL(35, 57).

The study conducted in Jeddah, Saudi Arabia result described age of participant had significant association with SBL (54). In contrast to this, the study done in Louisiana State University (southern USA) reported that there was no correlation between age and learning styles(46).

Gender was found to be a key determinant in satisfaction. The studies conducted in Saudi Arabia, being female had slightly high satisfaction than male (35, 56). In contrast to this, the studies in Egypt, Saudi Arabia informed that no association between socio-demographic factors and satisfaction with SBL (41, 52, 58).

2.2.4 Educational practice

The study conducted in Australia reported active learning, collaboration and variety of learning styles had association with SBL (59). Similarly in Colombia, study reported positive association between learning environment and satisfaction with SBL (60).Similarly this study was supported with the studies carried out in USA and Korea which reported students' satisfaction increased with team activities(5, 61). Besides, in Salem, supportive evidence reported that collaboration, diverse way of learning and importance of high expectation factors were significantly associated

which were increased as year of education increased but high expectation was the reverse (57). The study conducted in Saudi Arabia ,satisfaction with active learning item rated highest mean value (4.73) how my teacher taught the simulation (40).In Norway across sectional study reported that only active learning associated with satisfaction of SBL which stated students' who actively participated in SBL were increased satisfaction with AOR 0.28 (45).Across sectional study done in Egypt, more than half students perceived how their instructor taught Simulation, wide range of educational materials and method of instruction respectively(52).

In Harar a study reported that teacher's assistance, suitable ways of teaching and schedule programs were significantly associated with students' satisfaction with SBL. Teachers presented skill demonstration were AOR 22.4 with simulation-based education (32). But the study conducted in Gondar teacher's assistance who perceived was good only significantly associated (31).

2.2.5 Simulation design

According to Jeffries simulation theory; Fidelity, Problem solving, feedback/reflection, objective and support were sub variables (factors) for satisfaction with SBL(38).The study conducted in USA under graduate degree nurse students, Debriefing/reflection AOR 34.25 was vital factor for simulation based education (62).similarly the study conducted in England, during debriefing session, students discussed their performance perceived 68.5% strongly agreed (63). The study conducted in Australia showed highest mean value of learning experience(4.48) followed by reflection(4.46) (42).Besides, the study conducted in USA, reported Feedback/Guided Reflection highest mean(4.51)value and problem solving less mean value (4.1) scored(5). Organized simulation-based education incorporated problem-based learning used to solve various cases/problems according to the study conducted in Finland(64) and Germany(65)

In Saudi Arabia reported that fidelity (realism) was an important factor for SBL in which most students were satisfied (66).In addition, study done in Norway indicated that high mean score(4.82) for fidelity was reported (45). According to

the study done in Singapore reported students ‘ who attained objectives and information AOR 0.42 , support AOR 0. 27 and problem solving with AOR 0.28 times increased students’ satisfaction (67). Similar study done in china also reported that inform teaching objective increased students’ satisfaction with AOR 2.3 and support with AOR 2.2times (68).

In Africa mixed study conducted in low resource countries in Tanzania and Madagascar diploma nurse students perceived simulation as pedagogy, scored median value for importance of simulation design was (4/5)(24).According to the study carried out in South Africa, debriefing was not regularly reported (69).The cross sectional study conducted in Egypt among 118 nurse students’, the study reported majority students perceived as constructive strategy for simulation rated highest mean (3.32) for feedback /guided reflection (52).

2.2.6 Organizational related factors

Resources, staff, duration of session and space significantly associated with SBL. The study conducted in United States, there was a lack of skill lab availability (41%), expense (33%), no access to simulation centers (33%), lack of trained faculty (27%) and time restrictions (27%)(70). The study carried out in Canada lack of allocated faculty time (75%) and protected time within a curriculum (31%) were reported(71) In China the study carried out showed seven participants reported barrier of integrate simulation in to curriculum because they perceived it time consuming(72)

In Saudi Arabia a study reported that resources (55.5%) and space (51%) were sufficient but high number of students in each room (60.2%) (73). Across sectional study in Riyadh, Students were dissatisfied with trained staff perceived 66% (35).Across sectional study conducted in Saudi Arabia showed that 81.8% preclinical students dissatisfied with lab room suitability (7).Similarly in Quite perceived barrier of quality faculty 6.8% (74).

In Africa, access to high-quality technologies was inadequate and simulation systems were less designed equipment (31). Similar study conducted in Cameroon reported that inadequately trained staff, lack of clinical instructors and lack of simulation knowledge were 73.3%, 50% and 34.9% respectively (23). The study carried on diploma level midwifery students in Ethiopia, perceived number of skills lab assistants and effective in supporting students 41% and 59.4% respectively (27).

3. Conceptual frame work

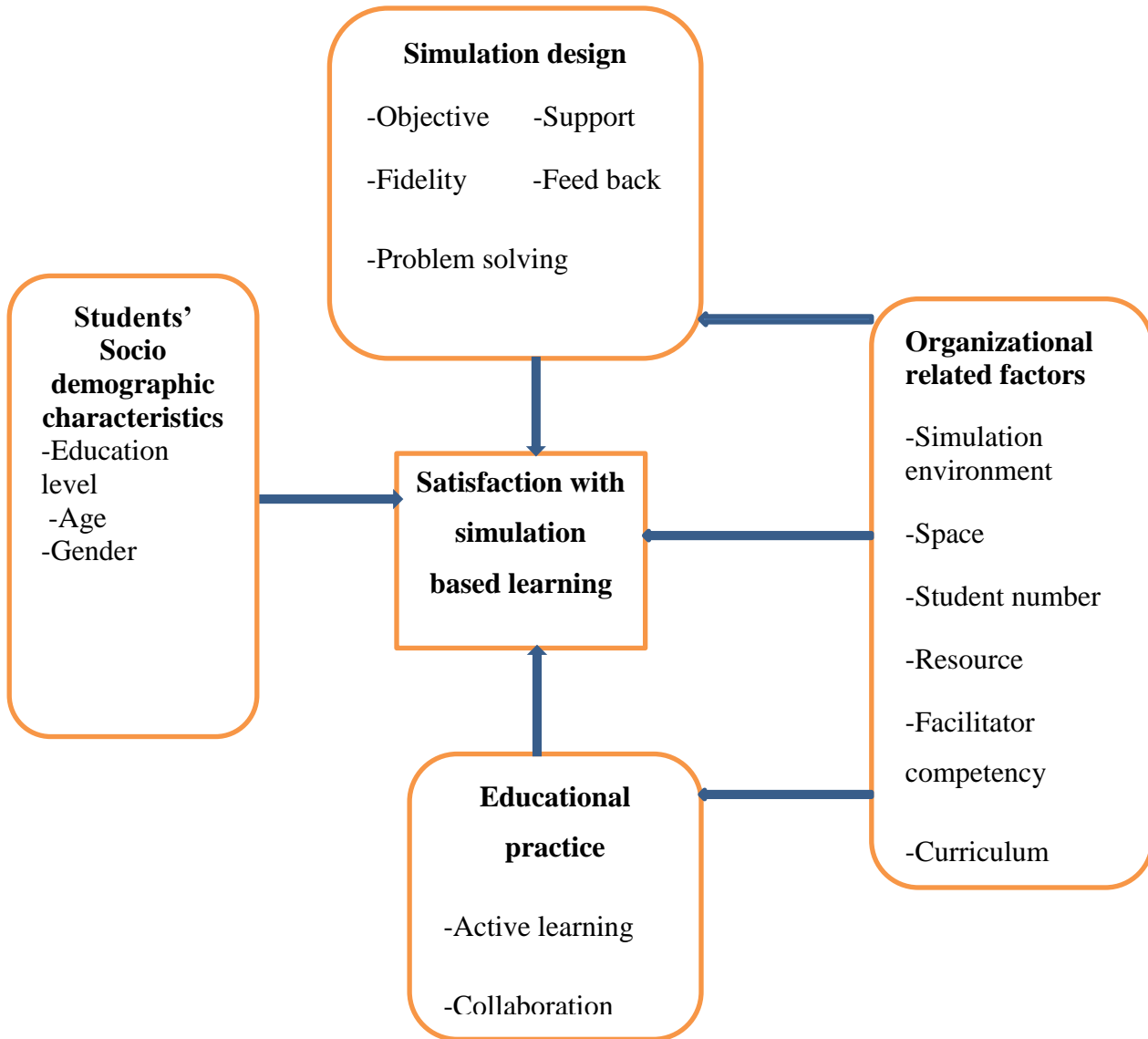


Figure 1: Conceptual frame work of satisfaction with SBL practice and associated factors among level based public health science college students, Amhara, Ethiopia was adapted(12, 23, 31, 32, 38, 75).

4. OBJECTIVES

4.1 General objective

- To assess level of satisfaction and associated factors of simulation based learning among level based public health science college students, Amhara , Ethiopia, 2021.

4.2 Specific objectives

- To determine level of satisfaction with simulation based learning among level based public health science college students in Amhara region, Ethiopia, 2021.
- To identify factors associated to satisfaction with simulation based learning among level based public health science college students, Amhara , Ethiopia, 2021.

5. Methods and materials

5.1 Study area and period

The study was conducted in under TVET public health science colleges in Amhara regional state specifically Bahir Dar, Tseda, Debretabor, Dessie and Debre Brhan health science colleges. Bahir Dar health Science College which is located in Bahir Dar city, 565 km far from Addis Ababa and has delivered level based education to programs of Nurse, midwife, Anaesthesia, Health extension, Health informatics, Radiography, Pharmacy and laboratory departments with a total 1087 number of students.

Debre tabor health Science College which is located in Debre tabor town which delivers level based education for health programs with total of 1067 students. Tseda health Science College is located in Gondar city with a total of 1500 students. Dessie health Science College is located in south wollo zone with a total of 1441 students and Debre brhan health Science College is located in north shewa zone with a total of 1038 students (39). The data were collected from September 6th up to October 6th, 2021.

5.2 Study design

Institution based cross sectional study was conducted

5.3 Population

5.3.1 Source population

All public level based health science college students in Amhara regional state

5.3.2 Study population

All Bahir Dar and Tseda level based health science college students

5.3.2 Study unit

Systematically selected public level based health science college students

5.4 Eligibility criteria

5.4.1 Inclusion criteria

- ✓ Students who attended at least one clinical attachment in skill practice.

5.4.2 Exclusion criteria

- ✓ Students who had no clinical practice experience

5.5 Sample size determination and sampling technique

5.5.1 Sample size determination

The sample size was determined using a single population proportion formula by assuming 50% satisfaction ,no study done on level of satisfaction among level based students and a 95% confidence level, 5% level of precision, as well as 10% non-response rate.

$$n = \frac{(Z_{\alpha/2})^2 p(1-p)}{d^2}$$

$$d^2$$

n = Minimum sample size

Z $\alpha/2$ = Z value at 95% CI (1.96)

p = Assumed level of satisfaction 50% (0.5)

d = Margin of error 5% (0.05)

$$n = z^2 P (1-p) / d^2 = 1.96^2 \times (0.5(1-0.5)) / 0.05^2 = 384$$

Therefore by adding 10% nonresponse rate , the total sample size of the study was 422 students.

5.5.2 Sampling technique

In order to select the study participants, first the two colleges randomly selected and these college students' proportionally allocated Then final sample size was drawn by systematic random sampling technique using k^{th} –interval (k=6) of students in each class. The first participant was selected using lottery method.

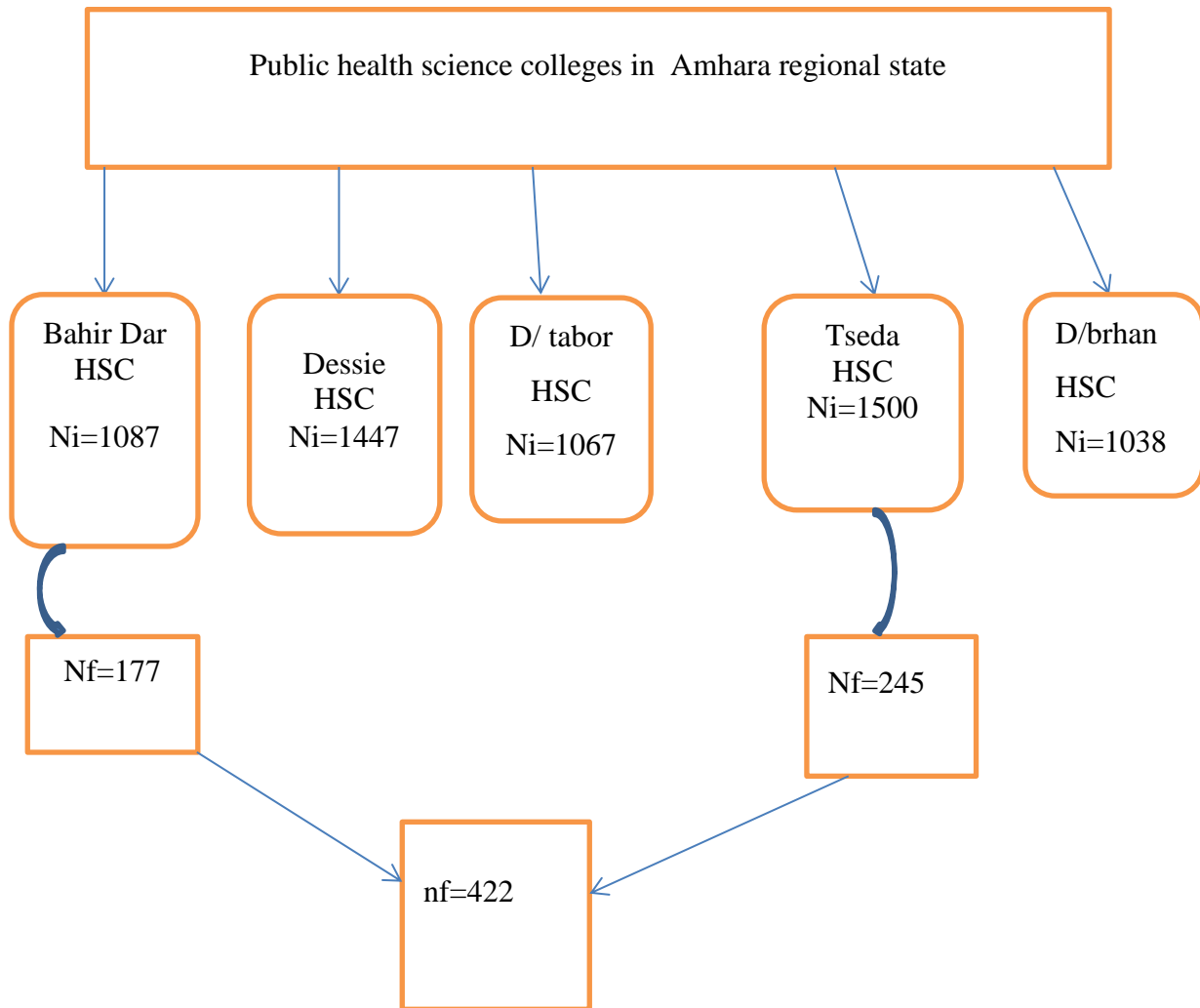


Figure 2 : Schematic diagram for the study to assess students' satisfaction with simulation based learning in public health science colleges, Amhara , Ethiopia.

Key:

Ni: number of college students

Nf: proportional allocated students

nf: final sample size

5.6 Variables

5.6.1 Dependent variable

- Satisfaction with simulation based learning

5.6.2 Independent variables

- Socio-demographic characteristics; Age, gender, level of education
- Educational practice related factors; Active learning, Collaboration
- Simulation design related factors; Objective ,Support, Fidelity, feedback, Problem solving
- Organizational related factors; Simulation environment ,Space, Number of students, Resource, Facilitator competency, Curriculum

5.6.3 Operational definitions

- **Satisfaction:** based on data distribution categorized as **dissatisfied** who scored below median and **satisfied** above median value scored based on computed and summed scores of items (31, 76).
- **Simulation:** Simulation is the imitation of reality (1)
- **Active learning:** Students' perception presence of active participation and opportunity to exchange ideas and concepts (45)
- **Collaboration:** Students' perception presence of work together at time of simulation(45)
- **Clear objective :** Students' perception presence of well-designed and clear objectives
- **Problem solving :** Students' perception presence of opportunities independently solve problems
- **Support :** Presence of facilitators'(instructors') assistance in simulation practice
- **Fidelity:** Students perception presence of real life situation in simulation
- **Feedback:** Presence of constructive feedback in simulation practice
- **Adequate space for skill practice:** 2.2 metre square per students(77)

- **Adequate supply of simulators:** One simulator per six student(77)
- **Adequate number of movable chairs for each station :** One chair per student
- **Appropriate number of students in skill lab :** 20 students per skill lab room
- **Adequate ventilation:** Greater than and equals two windows in each room
- **Skill lab environment conduciveness:** presence of regular simulation room cleaning and adequate ventilation
- **Facilitator competency:** Students' perception presence of instructors'/lab assistants' skill experience
- **Integrated curriculum:** Presence of simulation based learning incorporated curriculum

5.7 Data management and analysis

5.7.1 Data collection tools

The data were collected using standardized questionnaire adapted from national league for nursing/Jefferies (78) collection tool to measure students' satisfaction with simulation based practice related to their agreement using 5-point liker scale. The questionnaire were contained satisfaction with current learning (9 items), socio demographic characteristics (3items), educational practice related descriptions (6 items), and simulation design related descriptions (9 items) and organizational related variables(20 items) adapted from federal technical vocational education and training (FTVET) standards (77). It was translated to local language into Amharic version and then it was returned back to English language by language experts. Three BSC nurses for data collection and three MSC /MPH health professionals for supervision who were not in the study area were selected. The questionnaire was self-administered.

5.7.2 Data quality assurance

Data quality was assured through training of data collectors on objectives and questionnaire. Pre-test was conducted in Alkan health science private college among 5% of sample size in two weeks before deployment for data collection. After pre-test

any ambiguity, confusions, difficult words and differences in understanding were revised based on pre-test experience. Reliability and validity of the tool was conducted. Cronbach's coefficient alpha value was 0.73. Completeness and consistency of questionnaire were checked before and immediately after collecting by each data collectors and supervisors.

5.7.3 Data analysis

The collected data were checked for its completeness and coded data were entered to epidata version 4.1 and then exported to SPSS version 25 for more data cleaning and analysis. Descriptive statistics was used to describe study population in relation to relevant variables. A bi variable analysis was used to find out association of independent variables. Variables with p-value <0.25 in Bi variable analyses was entered to multivariable analysis. Adjusted Odds ratio with its 95% CI was reported and P- value < 0.05 was considered as statistically significant.

5.8 Ethical clearance

Ethical clearance letter was obtained from BDU institution review board (IRB) college of medicine and health Science on date 05/01/2014 E.C, Ref. No. Medical /3016/24 .Formal letter was submitted to selected public health science colleges. Verbal consent was obtained from individual participant. Participants were informed, they had full right to refuse/ withdraw from participation. Individual confidentiality was secured.

6. RESULTS

6.1 Socio demographic characteristics of participants

In the study 422 students were enrolled and the response rate was 412 (97.6%). More than half of participants 211(51.2%) were females. The majority of participants 244 (59.2%) were in age group of 20-24 years old with a median age of 22 years (IQR 18-35). It was observed that 301(73.1%) participants' educational status were level- IV and the least participants 19(4.6%) were level –V students (Table1).

Table 1:Socio demographic characteristics of level based public health science college students, Amhara , Ethiopia, 2021.

Characteristics	Category	Frequency(N)	Percentage (%)
Sex	Female	211	51.2
	Male	201	48.8
Age group	<20 years	83	20.1
	20-24 years	244	59.2
	>=25 years	85	20.6
Education level	Level-III	92	22.3
	Level-IV	301	73.1
	Level-V	19	4.6

6.2 Educational practice related factors

Among the study participants 219 (53.2%) and 289 (70.1%) were disagree in active learning and collaboration respectively. It was apparent that students perceived educational practice sub scale elements were active learning median score 19, IQR (5-25) followed by collaboration median score 4, IQR (1-5).

Table 2: Educational practice of level based public health science college students, Amhara , Ethiopia, 2021.

Educational practice sub variables	Category	Frequency(N)	Percent (%)	Median
Active learning	Disagree	219	53.2	
	Agree	193	46.8	19
Collaboration	Dis agree	289	70.1	
	Agree	123	29.9	4.0
Total		422	100	

6.3 Simulation design related factors

More than half study participants were disagree with objective and information 207(50.2%), support 225(54.6%), problem solving 257(62.4%), feedback 224(54.4%) and fidelity of SBL 336(81.6%) respectively. It was observed that students perceived problem solving received highest median score 11, IQR (3-15) followed by objective and information median score 7, IQR (2-10) and finally fidelity had lowest median score 1.0, IQR (1-2) (figure 3).

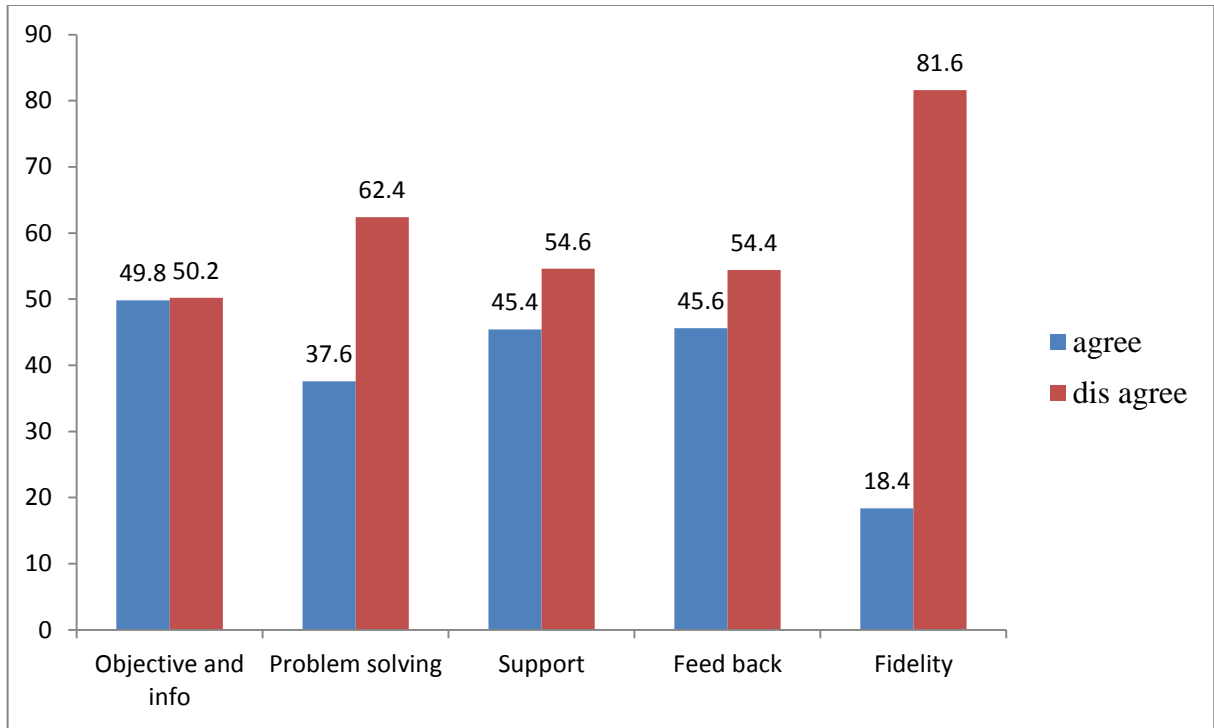


Figure 3: simulation design factors among level based public health science college students, Amhara , Ethiopia, 2021.

6.4 Organizational related factors

Among study participants 118(28.6%) and 108(26.2%) perceived lack of skill lab environment conduciveness and resource respectively. More than half of participants 263(63.8%) perceived more than 20 students in skill lab room present in one session and 244(59.2%) students perceived lack of skill lab adequate space. Additionally with facilitators competency 152(36.9%) and curriculum integration 144(35%) students were dissatisfied respectively.

Table 3: Organizational related factors among level based public health science college students, Amhara , Ethiopia, 2021.

Organizational related variables	Category	Frequency (N)	Percentage (%)
Skill-lab environment conduciveness	Yes	294	71.4
	No	118	28.6
Adequacy of resource	Yes	304	73.8
	No	108	26.2
No of students in skill lab>20	Yes	263	63.8
	No	149	36.2
Space adequacy	Yes	168	40.8
	No	244	59.2
Facilitator competency	Yes	260	63.1
	No	152	36.9
Integrated curriculum	Yes	268	65.0
	No	144	35
Total		412	100

6.5 Students' satisfaction with simulation based learning

In this study proportion of students' satisfaction with simulation based learning was found to be 45.6% with (95%CI: 0.40-0.50).

6.6 Factors associated with students' satisfaction with simulation-based learning

Sex of participant, level of education, active learning, collaboration, problem solving, objective, support, feedback, fidelity, simulation environment, space, resource, number of students, facilitator and curriculum were factors significantly associated to students' satisfaction with SBL in bi-variable logistic regression analysis. As well as Active learning, objective and information, collaboration and problem solving were factors significantly associated to satisfaction with SBL in multivariable logistic regression analysis.

The study finding indicated that those students perceived agree with active learning were 3 times (AOR =2.905, 95% CI=1.686-5.006, P<0.001) more likely satisfied with simulation based learning than students perceived dis agree scored. Students who worked with their peers collaboratively were 2 times (AOR=2.090, 95%CI=1.173-3.725, P < 0.012) more likely satisfied with SBL than students worked alone. Those students who perceived objective and information were 2times more likely satisfied with SBL (AOR=2.246, 95%CI=1.306-3.862, P<0.003).Students who perceived agree with problem solving were 3 times (AOR=2.648, 95%CI=1.472-4.763, P<0.001) more likely satisfied with SBL than students perceived disagree scored.

Table 4: Bi variable and Multivariable logistic regression of the factors associated with satisfaction related to simulation-based learning among level based public health science college students, Amhara , Ethiopia, 2021

Variables	Categorized Variables	Level of satisfaction		COR (95%CI)	AOR (95% CI)	P-value
		Satisfied	Dis-Satisfied			
Sex	Male	82	119	1.5(0.99-2.2)	1.2(0.73-1.98)	0.48
	Female	106	105	Ref	Ref	
Level of education	Level III	37	55	1.9(0.6-5.7)	1.8(0.41-7.65)	0.45
	Level IV	146	155	2.6(0.9-7.5)	3.2(0.80-13.10)	0.10
	Level V	5	14	Ref	Ref	
Active learning	Agree	136	57	7.7(4.9-11.9)	2.9(1.68-5.00)	0.000**
	disagree	52	167	Ref	Ref	
Environment	yes	151	143	2.3(1.5-3.6)	1.6(0.89-2.97)	0.108
	no	37	81	Ref	Ref	
Fidelity	agree	57	19	4.5(2.7-8.2)	1.8(0.90-3.45)	0.097
	dis agree	131	205	Ref	Ref	
Collaboration	Agree	87	36	4.5(2.9-7.1)	2.09(1.17-3.72)	0.012**
	Disagree	101	188	Ref	Ref	
Curriculum	Yes	145	123	2.8(1.8-4.3)	1.4(0.77-2.46)	0.280
	No	43	101	Ref	Ref	
Facilitator	Yes	137	123	2.2(1.5-3.3)	1.2(0.66-2.12)	0.556
	No	51	101	Ref	Ref	
Resource	yes	155	149	2.4(1.5-3.8)	1.1(0.55-2.01)	0.867
	no	33	75	Ref	Ref	
Feed back	agree	116	72	3.4(2.3-5.1)	1.1(0.64-1.91)	0.714
	disagree	72	152	Ref	Ref	
Support	agree	116	71	3.5(2.3-5.2)	1.0(0.59-1.82)	0.886
	dis agree	72	153	Ref	Ref	
No of	<=20	57	92	0.6(0.4-0.9)	1.4(0.79-2.37)	0.249

student	>20	131	132	Ref	Ref	
Adequate Space	yes	93	75	1.9(1.3-2.9)	1.1(0.64-1.81)	0.761
	no	95	149	Ref	Ref	
Objective	Agree	137	68	6.2(4.0-9.5)	2.25(1.30-3.86)	0.003**
	Dis agree	51	156	Ref	Ref	
Problem-solving	Agree	115	40	7.2(4.6-11.4)	2.65(1.47-4.76)	0.001**
	Dis agree	73	184	Ref	Ref	

Ref : reference

P-value <0.05 statistically significant

7. DISCUSSION

In this study proportion of students' satisfaction with simulation based learning was 45.6% (95% CI: 0.40-0.50). This result is congruent with the study carried out in Egypt, 46.3% students' level of satisfaction(53). The result is lower as compared to studies conducted in Gondar(31) and Harar ,Dire Dawa university(32) indicated proportion of satisfaction with SBL were 54.2% and 70.98%.This difference might be due to level of education and number of students in simulation laboratory room . This result also incongruent with studies in Egypt (59%)(52) ,Saudi Arabia (85%)(35) and Palestine (80.7%) (49).This variation could be due to dissimilarity of technology advancement (standardized patient simulation), For example, evidence showed that use of standardized patient simulation enhanced student satisfaction with their learning (47).

This study showed that students' active learning was statistically significant association with satisfaction of simulation based learning. Students' with active learning perceived agree scored were 2.9 times (AOR =2.9, 95% CI=1.7-5.0) more likely satisfied with simulation based learning than perceived dis agree scored with active learning. This finding is in line with study conducted in Australia(59), USA(5) , Saudi Arabia(40). and also similar study done in Norway(45) .In contrast the study conducted in Egypt(52) stated students' perceived active learning less value scored among education practice sub variables this might be due to covid-19 pandemic stress full condition who engaged simulation in their home virtually and had no interaction with their teachers.

According to this study collaboration was statistically significant association with satisfaction of simulation based learning. Students' who worked with their peers collaboratively were 2.09 times (AOR=2.09, 95%CI=1.17-3.73) more likely satisfied with SBL than who worked alone (no collaboration).This result is congruent with similar studies conducted in Australia(59), USA(5) and Salem(57).Also similar study done in Korea(61) stated team activity was significantly associated with students' satisfaction .This might be due to the fact that students in simulation lab who

demonstrated procedures learn from other comments and doing which increased students' satisfaction with SBL. In contrast to this study a research done in Norway(45) didn't show significant association. This difference might be due to variation of students' exposure and engagement which data collected after 3hour scenario based simulation (computer full body/video) exposure in Norway. But in this study colleges used manikins (human model) type of simulation which encourages working collaboratively in simulation skill lab.

According to this study problem solving was significantly associated with satisfaction of simulation based learning. Students' who perceived problem solving were 2.65times (AOR=2.65, 95%CI=1.47-4.76) more likely satisfied with simulation based learning than who perceived disagree rated problem solving possibilities. This study is consistent with study in USA(5). This could be due to simulation based learning initiated students to solve problems which raise their satisfaction. Also this study is congruent with the study done in Singapore (67). Due to the fact, organized simulation-based education incorporated problem-based learning helped to solve various cases according to the study conducted in Finland(64)and Germany(65).However the study carried out in Norway incongruent with this study(45).This difference might be due to methodology and students' socio demographic characteristics.

According to this finding objective and information was significantly associated with satisfaction of SBL. The odds 'of students who perceived agree scored objective and information were 2.25 (AOR=2.25, 95%CI=1.31-3.86) times more likely satisfied than those who did not get information and understand purpose of simulation. This supported with the study conducted in Singapore(67) and china(68).

8. LIMITATION OF THE STUDY

Self-administered questionnaire biases were incorporated, like social desirable bias might have occurred. Even though it was not completely ruled out, they tried to minimize it.

9. CONCLUSIONS

Along with the limitations of the study mentioned above, the overall proportion of students' satisfaction with simulation based learning was low (45.6%) compared to other regions as measured by Jeffers nursing simulation frame work. Presence of Active learning, collaboration, problem solving and clear objectives were factors significantly associated to satisfaction with simulation based learning. In this study number of students in simulation lab was greater than 20 in one session. Even, not associated with students' satisfaction had a great impact on skill lab practice. Finally this study concludes that students' satisfaction with simulation based learning practice needs special consideration.

10. RECOMMENDATIONS

Based on the result of the present study, the following points are recommended:

- ❖ For Regional health bureau, TVET, health science college managers
 - ✓ Shall to strengthen simulation based learning practice
 - ✓ Shall to incorporate in curriculum particularly active learning, collaboration, clear objectives and problem solving components
- ❖ For health science college teachers
 - ✓ Shall to strengthen their simulation based education delivery system
- ❖ For students
 - ✓ Shall to actively participate and work collaboratively in SBL
 - ✓ Shall to improve their problem solving skill and understand objective of SBL
- ❖ For researchers
 - ✓ Shall to conduct qualitative study on simulation based learning practice among under graduate health sciences students to address further organizational related factors with simulation based learning

11. REFERENCES

1. Gaba DM. The future vision of simulation in health care. *Quality & safety in health care*. 2004;13 Suppl 1(Suppl 1):i2-10.
- 2 Brown KM, Paige JT. *Simulation in Surgical Training and Practice*. Preface. *The Surgical clinics of North America*. 2015;95(4):xvii-xviii.
- 3.Roh YS, Jang KI. Survey of factors influencing learner engagement with simulation debriefing among nursing students. *Nursing & health sciences*. 2017;19(4):485-91.
4. Kim J, Park J-H, Shin S. Effectiveness of simulation-based nursing education depending on fidelity: a meta-analysis. *BMC medical education*. 2016;16(1):152.
- 5.Lubbers J, Rossman C. Satisfaction and self-confidence with nursing clinical simulation: Novice learners, medium-fidelity, and community settings. *Nurse Education Today*. 2017;48:140-4.
- 6.Elshama SS. How to apply Simulation-Based Learning in Medical Education? *Iberoamerican Journal of Medicine*. 2020;2(2):79-86.
- 7.El Nagggar MA, Almaeen AH. Students' perception towards medical-simulation training as a method for clinical teaching. *JPMA The Journal of the Pakistan Medical Association*. 2020;70(4):618-23.
- 8.Mukarwego B. *Midwife lecturers perception on simulation as a Teaching method in the simulation Center: University of Rwanda*; 2017.
- 9.Tosterud R. *Simulation used as a learning approach in nursing education: Students' experiences and validation of evaluation questionnaires: Karlstads universitet*; 2015.
10. Kantar RS, Ramly EP, Almas F, Patel KG, Rogers-Vizena CR, Roche NA, et al. Sustainable cleft care through education: the first simulation-based comprehensive workshop in the middle east and North Africa Region. *The Cleft Palate-Craniofacial Journal*. 2019;56(6):735-43.

11. Baptista RCN, Martins JCA, Pereira MFCR, Mazzo A. Students' satisfaction with simulated clinical experiences: validation of an assessment scale. *Revista latino-americana de enfermagem*. 2014;22:709-15.
12. Al Khasawneh E, Arulappan J, Natarajan JR, Raman S, Isac C. Efficacy of Simulation Using NLN/Jeffries Nursing Education Simulation Framework on Satisfaction and Self-Confidence of Undergraduate Nursing Students in a Middle-Eastern Country. *SAGE open nursing*. 2021;7:23779608211011316.
13. Renouf TS, Doyle M, Pollard M, Bankovic T, Dubrowski A. Collaborative development of a simulation-augmented health education program in resource-challenged regions. *Cureus*. 2018;10(6).
14. Institute Jrat. CULTIVATING A CULTURE OF SELF-DIRECTED, SIMULATION-BASED LEARNING. 2020.
15. Gedlu E, Tadesse A, Cayea D, Doherty M, Bekele A, Mekasha A, et al. INTRODUCTION OF SIMULATION BASED MEDICAL EDUCATION AT ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES: EXPERIENCE AND CHALLENGE. *Ethiopian medical journal*. 2015:1-8.
16. Etanaa NB, Benwu KM, Gebremedhin HG, Desta HB. The effect of simulation-based training in non-physician anesthetists in Tigray region, Ethiopia. *BMC research notes*. 2020;13:1-5.
17. Zhao Y, Hu Y, Liang J, Qian X. A pilot study on the simulation-based training for Ethiopia skilled birth attendants. *Nurse Education in Practice*. 2019;34:130-8.
18. Daneman D, Benatar S. Dynamic tensions following new pedagogy in undergraduate medical education. *Academic Medicine*. 2019;94(12):1873-7.
19. Simper N, Scott J, Frank B, editors. Value Added: Demonstrating Student Skill Development at Your Institution. 14th Annual Conference of the International Society of Scholarship of Teaching and Learning (ISSOTL): REACHING NEW HEIGHTS; 2017.
20. Brown JE. Graduate Nurses' Perception of the Effect of Simulation on Reducing the Theory-Practice Gap. *SAGE open nursing*. 2019;5:2377960819896963.

21. Offiah G, Ekpotu LP, Murphy S, Kane D, Gordon A, O'Sullivan M, et al. Evaluation of medical student retention of clinical skills following simulation training. *BMC medical education*. 2019;19(1):263-.
22. Bulamba F, Sendagire C, Kintu A, Hewitt-Smith A, Musana F, Lilaonitkul M, et al. Feasibility of Simulation-Based Medical Education in a Low-Income Country: Challenges and Solutions From a 3-year Pilot Program in Uganda. *Simulation in Healthcare*. 2019;14(2):113-20.
23. Fongang CL, SNAaMBSA. FACTORS THAT IMPEDE OR ENHANCE THE USE OF SIMULATIONS BY NURSE EDUCATORS IN PUBLIC AND PRIVATE INSTITUTIONS OF TRAINING IN CAMEROON. *International Journal of Nursing, Midwife and Health Related Cases*. 2017;Vol.3, No.3, pp.33-46.
24. Bø B, Madangi BP, Ralaitafika H, Ersdal HL, Tjoflåt I. Nursing students' experiences with simulation- based education as a pedagogic method in low- resource settings: A mixed- method study. *Journal of clinical nursing*. 2021.
25. Rule AR, Tabangin M, Cheruiyot D, Mueri P, Kamath-Rayne BD. The call and the challenge of pediatric resuscitation and simulation research in low-resource settings. *Simulation in Healthcare*. 2017;12(6):402-6.
26. Gauger VT, Rooney D, Kovatch KJ, Richey L, Powell A, Berhe H, et al. A multidisciplinary international collaborative implementing low cost, high fidelity 3D printed airway models to enhance Ethiopian anesthesia resident emergency cricothyroidotomy skills. *Int J Pediatr Otorhinolaryngol*. 2018;114:124-8.
27. Yigzaw T, Ayalew F, Kim Y-M, Gelagay M, Dejene D, Gibson H, et al. How well does pre-service education prepare midwives for practice: competence assessment of midwifery students at the point of graduation in Ethiopia. *BMC medical education*. 2015;15(1):1-10.
28. Bifftu BB, Dachew BA, Tadesse Tiruneh B, Mekonnen Kelkay M, Bayu NH. Perceived clinical competence among undergraduate nursing students in the university of Gondar and Bahir Dar university, Northwest Ethiopia: A cross-sectional institution based study. *Advances in Nursing*. 2016;2016.

29. Amsalu B, Fekadu T, Mengesha A, Bayana E. Clinical Practice Competence of Mettu University Nursing Students: A Cross-Sectional Study. *Adv Med Educ Pract.* 2020;11:791.
30. Adem S. NURSING SPECIALITY STUDENTS AND EDUCATORS
PERCEPTION AND EXPERIENCE OF SIMULATION BASED LEARNING AT SPHMMC. 2020.
31. Gudayu TW, Badi MB, Asaye MM. Self-efficacy, learner satisfaction, and associated factors of simulation based education among midwifery students: A Cross-Sectional Study. *Education Research International.* 2015;2015.
32. Jamie AH, Mohammed AA. Satisfaction with simulation-based education among Bachelor of Midwifery students in public universities and colleges in Harar and Dire Dawa cities, Ethiopia. *European journal of midwifery.* 2019;3:19.
33. Yoo J-H, Kim Y-J. Factors Influencing Nursing Students' Flow Experience during Simulation-Based Learning. *Clinical Simulation in Nursing.* 2018;24:1-8.
34. Aljahany M, Malaekah H, Alzahrani H, Alhamadah F, Dator WL. Simulation-Based Peer-Assisted Learning: Perceptions of Health Science Students. *Adv Med Educ Pract.* 2021;12:731-7.
35. Agha S, Alhamrani AY, Khan MA. Satisfaction of medical students with simulation based learning. *Saudi medical journal.* 2015;36(6):731-6.
36. Tjoflåt I, Koyo SL, Bø B. Simulation-based education as a pedagogic method in nurse education programmes in sub-Saharan Africa – Perspectives from nurse teachers. *Nurse Education in Practice.* 2021;52:103037.
37. Beroz S. A statewide survey of simulation practices using NCSBN simulation guidelines. *Clinical Simulation in Nursing.* 2017;13(6):270-7.
38. Jeffries PR, Rodgers B, Adamson K. NLN Jeffries simulation theory: Brief narrative description. *Nursing Education Perspectives.* 2015;36(5):292-3.
39. colleges Ahs. College annual reports. 2021.

40. Kaliyaperumal R, Raman V, Kannan LS, Ali MD. Satisfaction and self- confidence of nursing students with simulation teaching. *Int J Health Sci Res.* 2021;11(2):44-50.
41. Alammary MA. Saudi novice undergraduate nursing students' perception of satisfaction and self-confidence with high-fidelity simulation: A quantitative descriptive study. *Saudi Critical Care Journal.* 2017;1(4):99.
42. Curtis E, Ryan C, Roy S, Simes T, Lapkin S, O'Neill B, et al. Incorporating peer-to-peer facilitation with a mid-level fidelity student led simulation experience for undergraduate nurses. *Nurse Education in Practice.* 2016;20:80-4.
43. Rubbi I, Ferri P, Andreina G, Cremonini V. [Learning in clinical simulation: observational study on satisfaction perceived by students of nursing]. *Prof Infirm.* 2016;69(2):84-94.
44. Lubbers J, Rossman C. The effects of pediatric community simulation experience on the self-confidence and satisfaction of baccalaureate nursing students: A quasi-experimental study. *Nurse Education Today.* 2016;39:93-8.
45. Olaussen C, Heggdal K, Tvedt CR. Elements in scenario- based simulation associated with nursing students' self- confidence and satisfaction: A cross- sectional study. *Nursing open.* 2020;7(1):170-9.
46. Hurst KS. High Fidelity Simulation: Its Impact on Self-Confidence and Satisfaction in Learning Among Sophomore and Senior Students. 2015.
47. Goh Y-S, Selvarajan S, Chng M-L, Tan C-S, Yobas P. Using standardized patients in enhancing undergraduate students' learning experience in mental health nursing. *Nurse Education Today.* 2016;45:167-72.
48. Riaz S, Jaradat AAK, Gutierrez R, Garadah TS. Outcome of Undergraduate Medical Education using Medical Simulation according to Students' Feedback. *Sultan Qaboos Univ Med J.* 2020;20(3):e310-e5.
49. Salameh BS, Salameh B. Self-confidence and satisfaction among nursing students with the use of high fidelity simulation at Arab American University, Palestine. *Sciences.* 2017;3(2):15-23.

50. Findik ÜY, Yeşilyurt DS, Makal E. Determining student nurses' opinions of the low-fidelity simulation method. *Nursing Practice Today*. 2019.
51. Vera PIR, Martini JG. Satisfaction of nursing students with a clinical simulation practice in hi-fi settings. *Texto & Contexto-Enfermagem*. 2020;29(SPE).
52. Mohamed A, Mohame LK. Perceived Nursing Students' Satisfaction and Self-Confidence towards the Elements of Clinical Simulation Design and Educational Practice during the Outbreak of COVID-19 Pandemic. *Tanta Scientific Nursing Journal*. 2020;19(2):68-98.
53. AE G, AR S, AE H. Effect of Simulation on Maternity Nursing Students' Perception, Satisfaction and Self-Confidence. *Egyptian Journal of Health Care*. 2018;9(3):14-26.
54. Omer T. Nursing Students' Perceptions of Satisfaction and Self-Confidence with Clinical Simulation Experience. *Journal of Education and Practice*. 2016;7(5):131-8.
55. Saad Albagawi B, Grande RAN, Berdida DJE, Raguindin SM, Mohammed Ali AlAbd A, editors. Correlations and predictors of nursing simulation among Saudi students. *Nursing Forum*; 2021: Wiley Online Library.
56. Aljohani MS, Tubaishat A, Shaban I. The effect of simulation experience on Saudi nursing students' advance cardiac life support knowledge. *International Journal of Africa Nursing Sciences*. 2019;11:100172.
57. Zapko KA, Ferranto MLG, Blasiman R, Shelestak D. Evaluating best educational practices, student satisfaction, and self-confidence in simulation: A descriptive study. *Nurse Education Today*. 2018;60:28-34.
58. Attia HM, Sayed S, Metwally FG, Ata A. Students' Satisfaction and Self-Confidence with Simulation Training about Nursing Management Skills. *Annals of the Romanian Society for Cell Biology*. 2021:2058-62.
59. Tutticci N, Coyer F, Lewis PA, Ryan M. High-fidelity simulation: Descriptive analysis of student learning styles. *Clinical Simulation in Nursing*. 2016;12(11):511-21.
60. Aljohani AS, Karim Q, George P. Students' Satisfaction with Simulation Learning Environment in Relation to Self-confidence and Learning Achievement. *Journal of Health Sciences*. 2016;4:228-35.

61. Roh YS, Lee SJ, Mennenga H. Factors influencing learner satisfaction with team- based learning among nursing students. *Nursing & health sciences*. 2014;16(4):490-7.
62. Wallace D, Moughrabi S. The efficacy of simulation debriefing in developing critical thinking in accelerated baccalaureate nursing students. *Journal of Nursing Education and Practice*. 2016;6(5):13-8.
63. Morley D, Bettles S, Derham C. The exploration of students' learning gain following immersive simulation–The impact of feedback. *Higher Education Pedagogies*. 2019;4(1):368-84.
64. Keskitalo T, Kangas M, Ruokamo H, editors. *Best of Finland: Adult Playfulness in Simulation-based Healthcare Education*. EdMedia+ Innovate Learning; 2018: Association for the Advancement of Computing in Education (AACE).
65. Chernikova O, Heitzmann N, Stadler M, Holzberger D, Seidel T, Fischer F. Simulation-based learning in higher education: A meta-analysis. *Review of Educational Research*. 2020;90(4):499-541.
66. Aldhafeeri F, Alosaimi D. Perception of Satisfaction and Self-Confidence with High Fidelity Simulation Among Nursing Students in Government Universities. *Perception*. 2020;11(11).
67. Tan SHX, Ansari A, Ali NMI, Yap AU. Simulation design and students' satisfaction with home- based simulation learning in oral health therapy. *Journal of dental education*. 2021.
68. Zhu F-F, Wu L-R. The effectiveness of a high-fidelity teaching simulation based on an NLN/Jeffries simulation in the nursing education theoretical framework and its influencing factors. *Chinese Nursing Research*. 2016;3(3):129-32.
69. Thurling CH. Prevalence and use of simulation in undergraduate nursing education institutions in South Africa. 2016.
70. Chinnugounder S, Hippe DS, Maximin S, O'Malley RB, Wang CL. Perceived barriers to the use of high-fidelity hands-on simulation training for contrast reaction management: why programs are not using it. *Current problems in diagnostic radiology*. 2015;44(6):474-8.

71. Russell E, Hall AK, Hagel C, Petrosoniak A, Dagnone JD, Howes D. Simulation in Canadian postgraduate emergency medicine training—a national survey. *Canadian Journal of Emergency Medicine*. 2018;20(1):132-41.
72. Luo D, Yang B-X, Liu Q, Xu A, Fang Y, Wang A, et al. Nurse educators perceptions of simulation teaching in Chinese context: benefits and barriers. *PeerJ*. 2021;9:e11519.
73. Nuzhat A, Salem RO, Al Shehri FN, Al Hamdan N. Role and challenges of simulation in undergraduate curriculum. *Medical Teacher*. 2014;36(sup1):S69-S73.
74. Katoue MG, Ker J. Pharmacists' experiences and perceptions about simulation use for learning and development of clinical skills in Kuwait. *International journal of clinical pharmacy*. 2019;41(6):1451-61.
75. Mukaremera MA. Rwandan midwifery students benefits and barriers in the use of simulation based learning regarding neonatal resuscitation: University of Rwanda; 2019.
76. Sidhu TK, Kaur P, Mehra S, Prajapati PR, Sidhu GS, Singh N, et al. Experiences with development and use of simulation-based module for teaching family study skills to undergraduate medical students in coronavirus disease epoch. *Adesh University Journal of Medical Sciences & Research*.3.
77. Fikirte Alemayehu AA, Simiret Mersha...etl. *Internal Quality Assurance and Improvement Standards for Medical Laboratory Science Program (Levels II–V)*
First Edition October 2015.
78. <http://www.nln.org/professional-development-programs/research/tools-andinstruments/descriptions-of-available-instruments>. [Internet]. 2016.

Appendix 1 participant Consent information sheet -English version

Hello! My name is _____ I am one of the members of the research team, which has the Objective of to assess Satisfaction related to simulation based learning and its associated factors among level based public health science college students .

You will be selected to participate in this study, therefore you are kindly requested to participate in this study and provide the information required from you. Your participation in this study is completely on Voluntary basis and you have the right to refuse from participating. Your responses will be kept confidential and there will be no way of linking your individual responses to the final results of the study findings. We would like to inform you that the responses that you provide to the questions are very essential for the successful accomplishment of this study. Are you willing to participate in this study to give your responses based on the questionnaire?

1. Yes -----signature-----

2. No

Name and Signature of the data collector _____

Name and signature of the supervisor _____

Date of data collection _____

Code _____

Appendix 2 : Questionnaire

Part I: Socio demographical characteristics

Code	Question	Answer
101	Sex of participant	1.male 2.female
102	Age of participant	-----
103	Level of education	-----

Instructions: Please encircle numbers for the option you choose

Mark:

1 = STRONGLY DISAGREE with the statement

2 = DISAGREE

3= UNDECIDED - you neither agree or disagree with the statement

4= AGREE

5= STRONGLY AGREE

Part II: Satisfaction with Current Learning

Code	Questions					
201	The teaching methods used in this simulation were helpful					
202	I enjoyed how my instructor taught the simulation					

203	The teaching materials used in this simulation were helped me to learn					
204	The way my instructor(s) taught the simulation was suitable to the way i learn					
205	Clinical instructors/faculties give me sufficient guidance					
206	Clinical instructors/faculties encourage me to link theory to practice					
207	Clinical instructors/faculties are open to discussions					
208	Clinical instructors/faculties view my mistakes as part of my learning					
209	Clinical instructors/faculties provide enough opportunities for independent practice in simulation lab					

Part III: Educational Practices Questionnaire

Code	Item					
	Active learning					
301	I actively participated in debriefing session					
302	I learned from comments made by teacher					
303	I received cues during simulation in timely manner					

304	The instructor was able to respond to the individual needs of learners					
305	Simulation activities made my learning time more productive					
	Collaboration					
306	I had the chance to work with my peers during simulation.					

Part IV: Simulation design

	Item					
Cod e	Objectives and Information					
401	Enough information was provided					
402	I clearly understood the purpose and objectives of simulation					
	Support					
403	Support was offered in a timely manner					
	Problem solving					
404	Independent problem-solving was facilitated					
405	I was encouraged to explore all possibilities of simulation					

406	Simulation provided me an opportunity to set goal for patient					
	Feedback/Guided Reflection					
407	Feedback provided was constructive					
408	Feedback was provided in a timely manner					
	Fidelity (Realism)					
409	Real life factors built into Simulation scenario					

Part V: Organizational related factors

Code	Item	Yes	No		
	Adequate Space				
501	Have adequate space for skill practice and discussion (2.2 m ² /student)				
	Simulation lab (environment) conduciveness				
502	Having regular cleaning schedule for the facility				
503	Have Adequate ventilation				

	Resource				
504	An adequate (1:6 ratio) supply of simulators				
505	Adequate number of movable chairs for each station				
506	Having up-to-date learning materials (checklists for all skills, standard operating procedure)				
	Number of students				
507	Having appropriate number of students in skill lab (20 students per skill lab room)				
	Facilitator competency				
508	facilitators have simulation skill				
509	Implement a ratio of trainers to trainees of 1:25 for institutional training				
510	Facilitators Provide opportunities for repetition				
511	Facilitators guided by learning intentions				
512	Do facilitators use standardized				

	checklists				
513	Do facilitators use allocated time for simulation practice				
	Curriculum				
514	It was composed of the learning contents to match subjects				
515	Learning contents in simulation was easy to understand				
516	Integrating traditional knowledge, simulation, and being with real patients				
517	Communicate clear roles and responsibilities				
518	Incorporating students' lived experiences into the simulation process				
519	Move from individual skills acquisition to team building and performing capability				
520	Tolerate student failure				

Appendix 3 : የተሳታፊዎች የይዘት እና ፈቃድ ቅጽ

ጠፍ ይስትልኝ! ስሜ _____ እኔ ከምርምር ቡድኑ አባላት አንዱ ነኝ

በአሜሪካ ክልል ባሉ የ ህዝብ ጠፍ ሳይንስ ኮሌጅ ተማሪዎች መካከል ከሚከሰቱ ጉዳዮች ጋር ተያያዥኝ ት ያላቸውን እርካታ እና ተያያዥ ጉዳዮችን ለማጥናት ዓላማ ሲሆን : እርስዎ በዚህ ጥናት ወስጥ እንዲሳተፉ ተመርጠዋል ፣ ስለሆነ ም በዚህ ጥናት ወስጥ እንዲሳተፉ እና ከእርስዎ የሚፈልገውን መረጃ እንዲሰጡብትህትና ተጠይቀዋል : : በዚህ ጥናት ወስጥ የእርስዎ ተሳትፎ ማለት በሙሉ አስፈላጊ ነ ወ፡ :

በፈቃደኝነት ላይ የተመሠረተ እና የ መሳተፍም ያለመሳተፍም መበት አለዎት : : የእርስዎ ምላሾች ይቀመጡ ፤ ማህተራዊ እና የግለሰብዎን ምላሾች ከ የመጨረሻ ወጠቶች ጋር የማይካተቱ መንገድ አይኖርም

የጥናቱ ግኝቶች : : ለ. የ መህተፍቸውን ምላሾች ለማሳወቅ እንወዳለን

ጥያቄዎች ለዚህ ጥናት ስኬታማነት በጣም አስፈላጊ ናቸው : :

በ ላይ በመመርኮዝ ምላሾችዎን ለመስጠት በዚህ ጥናት ወስጥ ለመሳተፍ ፈቃደኛ ነ ዎት

መጠይቅ?

1. አዎ ----- ፊርማ-----

2. አይደለም

የ መረጃ አሰባሳቢውስም እና ፊርማ _____

የ ተቆጣጣሪውስም እና ፊርማ _____

የ መረጃ መሳተፍ ቀን _____

ኮድ _____

ኮድ _____

Appendix 4 : የአሜሪካ መጠይቅ

ክፍል I: ማህበራዊ ስነ-ህዝብ ባህሪዎች

ኮድ	ጥያቄ	መልስ
101	ጾታ	-----
102	ዕድሜ	-----
103	የትምህርት ደረጃ	-----

መሳሪያዎች- እባክዎን የሚጠችን መልስ አክብብ/ቢ

1= በጣም አልሰማም

2 = አልሰማም

3= አልወሰንም

4=እሰማለሁ

5=በጣም እሰማለሁ

ክፍል II በወቅታዊ ትምህርት እርካታ

ኮድ	ጥያቄዎች					
201	በዚህ የተግባር ትምህርት ወስጥ ጥቅም ላይ የዋሉት የ ማስተማር ዘዴዎች ጠቃሚ እና ወጠታማነት በሩ					
202	አስተማሪዎች የተግባር ትምህርት እንዴት እንዳስተማረ ደስ ብሎቻል					
203	በዚህ የተግባር ትምህርት ወስጥ ያገለገሉ የ ማስተማሪያ ቁሳቁሶች አነቃቂነት በሩ እና እንደማይረዱት ረድተዋል					
204	አስተማሪዎች (ሷ) የተግባር ትምህርት ያስተማረበት/ች መንገድ እኔ ከምግባር በት መንገድ ተስማሚነት በር					
205	የ ትግባር ልምድ ከመሰረቱ በፊት ክሊኒካዊ ማህራን /ፋኩልቲዎች በቂ መመሪያ ይሰጣሉ					
206	የ ትግባር ትምህርት ማህራን የንድፈ -ሀሳብን እወቅት ከ ልምድ ጋር እንዳገናኝ ያበረታቱኛል					
207	ክሊኒካል ማህራን ለወይይት እና ለተለያዩ አስተያየቶች ክፍት ናቸው					
208	ክሊኒካል ማህራን / ፋኩልቲዎች የእኔን ስህተቶች(የ ትግባር ትምህርት ስለመሆኑ) የ ትምህርቱ አካል አድርገው ይመለከቱታል					

209	ክሊኒካዊ መግቢያ / ፋኩልቲዎች በተግባር ትምህርት ወስጥ ለነፃ ልምምድ በቂ ዕድሎችን ይሰጣሉ						
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ክፍል III: - የ ትምህርት ልምዶች መጠይቅ

ኮድ	ንጥል						
	ንቁ ትምህርት						
301	ከተግባር ትምህርቱ በኋላ በማበራሪያ ክፍለ ጊዜ በንቃት ተሳትፎ ነበር						
302	ከተግባር ትምህርት በፊት ፣ ወቅት ወይም በኋላ በመግቢያ ክፍሎች አስተያየቶች ተምሪ አለሁ						
303	በተግባር ትምህርት ጊዜ ፍንጮችን በወቅቱ ተቀብያለሁ						
304	አስተማሪው በተግባር ልምምድ ጊዜ ለተማሪዎች የግለሰብ ፍላጎቶች ምላሽ መስጠት ችሏል						
305	የተግባር ልምምድ(መስመራዊ) እንቅስቃሴዎችን በመጠቀም የመገናኛ ጊዜዬን የበለጠ ወጠታማ አደረገኝ						
	መተባበር						
306	ከጓደኞቼ ጋር ለመስራት እድሉ ነበረኝ						

ክፍል አራት- የተግባር ትምህርት ንድፍ

	ንጥል					
ኮድ	ዓላማዎች እና መረጃዎች					
401	መመሪያ እና ማበረታቻ ለመስጠት በተግባር ትምህርት መጀመሪያ ላይ የቀረበውብቂ መረጃ ነበር					
402	የተግባር ትምህርቱን ዓላማ እና ዓላማዎች በግልጽ ተረድቻለሁ					
	ድጋፍ					
403	ድጋፍ በወቅቱ ተደረርጎልኛል					
	ችግር ፈቺ					
404	በራስ ችግርን መፍታት ያመቻችታል					
405	የተግባር ትምህርት እድሎችን ሁሉ ለመዳሰስ ተበረታታለሁ					
406	የተግባር ትምህርት ለታካሜ የተቀመጠውን ግብ የማድረግ እድል ሰጠኝ					
	ግብረመልስ					
407	የቀረበውግብረመልስ ገንቢ ነበር					
408	ግብረመልስ በወቅቱ ቀርቧል					
	ታማኝነት (አወነ ተኛነት)					

409	እወሳተኛ የተግባር ትምህርት ተገንብቷል						
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ክፍል V: የሰርቶ ማሳያ (ተግባር ትምህርት) መስናክሎች

ኮድ	ንጥል	አዎ (1)	አይደለም (2)
	በቂ ቦታ (የክህሎት ላብራቶሪ)		
501	ለክህሎት ልምምድ እና ለወይይት በቂ ቦታ አለ (የቦታ ጥበት የለም)	1	2
	የክህሎት ላብራቶሪ ዉበታ ምክንት		
502	ቋሚ የጽዳት ፕሮግራም አለ	1	2
503	ሰርቶ ማሳያ ዉበቂ የአየር ዝውውር አለ ዉ.	1	2
	የክህሎት ላብራቶሪ ቁሳቁሶች		
504	የማሳያ እቃዎች አቅርቦትን ጥጥር (1ለ 6) ነ ዉ.	1	2
505	ለእያንዳንዱ ጣቢያ የሚቀሳቀሱ ወንበሮች በቂ ናቸው	1	2

506	ሁሉም መሥሪያ ቤቶች በቅርብ (updated) የተዘጋጁናቸው	1	2
	በክህሎት ላብራቶሪ ውስጥ የተሥራዎቻቸው ብዛት		
507	በክህሎት ላብራቶሪ ውስጥ የተሥራዎቻቸው ብዛት ከ 20 በላይ ይሆናሉ	1	2
	መሥሪያ ቤቶች: የሰርቶሞክያ ባለሙያዎች		
508	አስተባባሪዎች (መሥሪያ ቤቶች) የሰርቶሞክያ ችሎታ (ክህሎት) አላቸው	1	2
509	ለተቋማዊ ስልጠና የአሰልጣኞች ምጣኔ 1 ለ 25 ሰልጣኞች (ተሥራዎች) ይተገበራል	1	2
510	የመድገም ምላሽ ስራዎችን (re demonstration trial) ይሰጣሉ	1	2
511	መሥሪያ ቤቶች በትምህርቱ ድብብ (ዓላማዎች) የሚሰጡ ናቸው	1	2
512	መሥሪያ ቤቶች ደረጃቸውን የጠበቁ የሚገኝ ጫዛርዛሮችን (ችክሊስት) ይጠቀማሉ	1	2
513	መሥሪያ ቤቶች ለማስመዘገብ (ሰርቶሞክያ) ልምድ የተመደበውን ጊዜ በአግባቡ ይጠቀማሉ	1	2
	ሥርዓተ ትምህርት		

514	የትምህርቱ ይዘቶች ከ ትምህርት አይነቱ ጋር አብሮ የሚሄድነው	1	2
515	የትምህርት ይዘቶች በቀላሉ መረዳት ይቻላል	1	2
516	ባህላዊ ዕውቀትን እና የክህሎት ትምህርቱን ከእውነታው ጋር ያዋህዳል	1	2
517	ግልጽ ሚናዎችን እና ኃላፊነቶችን ያሳውቃል	1	2
518	የተማሪዎችን የህይወት ልምዶች ወደ ማስመሰል(ሰርቶ ማሳያ) ሂደት ውስጥ ያካትታል	1	2
519	ከግል ክህሎቶች ግኝት ወደ ቡድን ግንባታ እና ችሎታን ክንውን ያመዘናል	1	2
520	ልምምድን እና ያልተሳካ አፈፃፀም ለመማር እድል ይሰጣል	1	2

Declaration

I, the under signed, declared and affirm that this thesis is my own work. This has not been previously submitted to this or any other institution for degree qualification and all sources of material used for this research work have been fully acknowledged.

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Name of Evaluator	Signature	Date

_____	_____	_____
Name of Evaluator	Signature	Date

Declaration

I, the undersigned, declare and affirm that this thesis is my own work. This has not been previously submitted to this or any other institution for degree qualification and all sources of material used for this research work have been fully acknowledged.

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Name of Evaluator Signature Date

_____ _____ _____
Name of Evaluator Signature Date

Habte  [Signature]

25-10-14