

Learner Satisfaction with Simulation-Based Education and Associated Factors among Undergraduate Regular Midwifery Students at Harar Health Sciences College, Haramaya and Dire Dawa Universities, Eastern Ethiopia

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Abstract

Background: Simulation-based education using low to high fidelity techniques are common in midwifery professionals' education and it is found to be a good alternative to fill the gaps in skill teaching and learning. Acquisition of clinical skills and its retention when ongoing practice is offered is determined by the reactions, interpretations as well as perceptions of the students in which learner satisfaction is the central element.

Objectives: The aim of this study was to assess the learner satisfaction with simulation-based education and associated factors among undergraduate regular midwifery students at Harar health sciences college, Haramaya and Dire Dawa universities, Eastern Ethiopia.

Methods: An institutional based cross-sectional study was conducted from April up to May 2018. The study population comprised all 3rd and 4th year undergraduate regular midwifery students. The data was collected through English, Amharic and Afan Oromo version self-administer questionnaire and the data entry was done by using Epi-info version-3.5.3 and analyzed by using SPSS version-20 software package. Bivariate and multivariate logistic regressions were used to identify factors associated with learner satisfaction and the degree of association was measured by using odds ratio with 95% confidence interval.

Results: The total of 244 third and fourth year midwifery students were recruited in the study and the findings showed that the proportion of learner satisfaction with simulation-based education is 70.95%. The effort of teachers in assisting their students during skill demonstration (AOR=5.622 (2.359-13.398), the suitability of the way of teaching to the learning styles of students (AOR=22.391 (10.770-37.529) and the availability of enough skill practicing programs per semester (AOR=2.344 (1.032-5.322) were statistically significantly associated factors with satisfaction in simulation-based education.

Conclusion: The study supports there is an important role of effort of teachers' assistance, the suitability of way of teaching to learning styles and having enough time and

program to practice what has been learned theoretically might gratify not only in simulation but also in actual patient care. Even though the level of satisfaction of simulation based learning among midwifery students is high when compared to recent previous study conducted in our country, proposing the means to get better teachers' assistance, counter parting the teaching and learning styles at simulation based education as well as planning enough skill practicing programs per semester is needed.

Keywords: Simulation; Midwifery students; Learner satisfaction; Counter parting

Introduction

Simulation is activities that mimic reality and/or a person, device or set of conditions which attempts to present education and evaluation of problems authentically. Simulation techniques and devices can comprise high-tech virtual reality simulators, full-scale mannequins, plastic models, instructed or standardized patients, animal or animal products, human cadavers or screen-based simulators and conditions like role-playing or interactive videos that help students learn and allow them to demonstrate decision making, critical thinking and other skills [1].

Recently, there has been a significant increase in awareness regarding the potential contributions that the midwives could make to a reformed healthcare system. Competition among programs for both primary care and specialty sites and preceptors continues to grow. The International Confederation of Midwives (ICM) has advocated a global standard for midwifery education. Even though some variations in midwifery education exist across the countries, the need of competence as well as the target areas in curricula which is more of practical is almost identical. In this type of education, the discrepancies among societal beliefs, the women's needs, the cultural influence and the context in which the midwives work are also the concerns that have their own influence.

Currently, nationwide, to meet the growing demand for healthcare services, there has been an increase in the number of programs offered in clinical education. In many locations, there

are multiple educational programs within a relatively small geographic area with rich teaching resources whereas in some regions, these programs share clinical resources to teach the skill part of the curricula. Having greater access to in-network clinical affiliates with teaching institutions also advantages health systems with multiple clinical sites within a network to improve the transfer of theoretical knowledge into practicable skill and hence look up for the benefit of simulation based education. In some instances, neighboring educational programs have created consortia with each other as well as with adjacent health care settings to share academic, clinical and financial resources and in turn the skilled students of health sciences help to progress the quality of care throughout their practical connection [2].

Different Higher Educational Institutes (HEI) use skill laboratories and demonstration classes to improve the quality of education especially health care related fields and thus a growing part of the curricula in midwifery education for the last decades to address the need of developing effective clinical skills prior to undertaking clinical practice. However, evidence for the use of simulation in midwifery is largely subjective and research evaluating the effectiveness of different levels of simulation fidelity are lacking. Even though the higher educational institutes have been applying simulation-based education in midwifery education over the past decades, the current status of maternal and neonatal mortality rate puts the skill competence of the midwifery professionals in question mark [3].

Since woman centered care is an interior contention of the midwifery profession, the need to adjust the clinical skill to guarantee the needs of each individual woman is the first priority in midwifery education and for such, simulation has been used to address the need to expand clinical skills before clinical practice to ensure patient safety, enhance clinical confidence prior to clinical exposure and reduce pressure on over-worked clinical environments thereby improving professionals self-confidence and satisfaction. Because HEIs have not used simulation based educations effectively, the midwifery professionals expanded to encounter complexities to apply their knowledge into practical care [4].

Provision of full package of services is mandatory to get better maternal and newborn health and depends on an adequate numbers, competent and full-bodied midwifery work force that determined by a quality midwifery education system. Universal health coverage goals desired by 2030 are also dependent on well designed and carefully monitored efforts towards this end. The change depends on the ability to rapidly identify curricular, faculty, infrastructure, management, clinical and student related factors, like students satisfaction, which impact the quality of this educational tool. As highlighted by researchers, the problem for the students was the application of skills where the students themselves unable to transfer classroom learning to the clinical environment. In addition, the lack of sufficient time that the students had to practice their skills as well as the importance of learning both reflection and critical reasoning skills also matters the effectiveness of simulation based education [5].

In developing countries like Africa, despite several intercontinental perseverance including the MDGs and national efforts, the maternal and neonatal mortality in low-income

countries is still high. A hundreds thousands of women and millions of neonates die every year because an important determinants, such as access to antenatal care, skilled attendance at birth and access to emergency obstetric care, to reduce such numbers of deaths were low. Accessibility of high quality technologies are poor and a few teaching institutions own them; in some situations, less interactive modes of teaching are being exercised. In such situations, teaching and learning processes are passive and hence the learners will be inert and poorly or not satisfied in their education. In practice based health care education, like midwifery and Nursing, methods of teaching and learning should focus on enabling students to assimilate clinical knowledge and skills. Such students need to learn how to apply class room education in the clinical context and this can be affected by students perceptions and satisfaction plus the interest they have in their knowledge and skills [6].

Materials and Methods

The burden of maternal and child mortality in Ethiopia is still high. The quality of education of midwives in Ethiopia is insufficient both theoretically and practically as studies show both lack of knowledge and skills. Poor competence leads to failure to handle obstetric problems in the BEmONC unit and further many women being referred to hospital while in labour. Considering the crucial role of midwives in reducing maternal and child morbidity and mortality and there is an increased focus on the education and deployment of midwives in low income countries. However, the pre-service education of midwives is poor in skill training and thus the need for in-service training is high and must to overcome gap in skill. Since the curriculum for midwifery education contends the 30% theory versus 70% practice, the need for simulation is higher and thereby knowing the level of satisfaction is a big issue of concern. Overstrained learning sites and low number of cases for the student compromised the quality of education and hold back the satisfaction of the students in their skill performance. As a result of this most of the students graduate without having attending the expected and required number of 40 uncomplicated deliveries [7].

Even though it can be proved that different modern simulation methods introduced to the education of midwives make the learning process more effective and students acquire skills and knowledge which they can use in clinical practice, the way of delivery, the students' understanding of the learning language in using different books, guidelines, checklists, etc. complicates the degree of understanding associated with their satisfaction towards the method. Thus, the issue of the students' satisfaction and abilities to be active within the patient-health care provision, search problems actively and independently and solve them in their clinical practice falls within different factors like availability of necessary materials within the skill labs, various skills of teachers, interest and attentions of the learners as well as curriculum related issues.

The satisfaction of the students determine the ability to learn and practice clinical skills in a controlled environment before they are required to practice on patients and thus it is a central

element as it determines interactivities of teaching learning process and applicability of the method. Even though there is no statistical significance in learners' satisfaction with simulation based education among junior midwifery students, it is high among more experienced students. Most of junior students believe that it is the knowledge which derives the necessary skills and in turn satisfaction, the idea which is less supported by more experienced students who consider satisfaction obtained after they perform a given procedure as a focal force of success in their education [8].

Students' satisfaction is a positive factor that determines the student's confidence of their skill performance. The increasingly competitive and dynamic educational environment and other challenges have made universities more aware of the importance of student satisfaction because it puts forth a greater influence on academic performance as it helps to build self confidence, which in turn assist the students, develop skills and acquire knowledge. Therefore, satisfaction can play a major role in the midwifery education. There is an increasing evidence of the need to evaluate the quality of midwifery education for greater accountability in response to the demands of healthcare institutions and consumers [9].

Simulation is a crucial component of paramedic education and as such must be continuously reassessed to ensure students are satisfied with this teaching method and that they have "active and meaningful" learning experiences. Therefore, a student's ability to develop skills and knowledge can be linked to their satisfaction with simulation, thus placing emphasis on appropriate evaluation on the ability to "create satisfying and engaging learning experiences [10].

Study design and setting

An institution based cross-sectional study design was conducted. The study was conducted at Harar health sciences college, Haramaya and Dire Dawa universities, eastern Ethiopia from April up to May, 2018 [11].

Sample size and sampling procedures

Sample size was calculated by using a single population proportion formula taking the proportion of learner satisfaction of 54.2% from the study done at university of Gondar, Ethiopia. By assuming 5% margin of error and 95% CI, the sample size was calculated as the below:

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

Where 'p' is the proportion of learner satisfaction, found from the study done at university of Gondar; which was 54.2%; 'n' is the minimum sample size; 'd' is degree of precision (how large error be tolerated) (5%) and 'zα/2' is the 95% confidence interval (which is 1.96).

$$n = \frac{(1.96)^2(0.542)(1-0.542)}{(0.05)^2} = 381$$

Since the total number of students is less than 10,000 (which is 540), the reduction formula was done as the following:

$$n_r = \frac{N \cdot n}{N+n} \rightarrow \frac{540 \cdot 381}{540+381} = 223.$$

By considering 10% non-response rate, the final sample size was 243.

A simple random sampling technique was used to select those eligible students from the total population.

Data collection instruments

English-version structured and pre-tested self-administer questionnaire which address socio-demographic characteristics, academic demand factors, guidance and teacher's related variables, skill practicing program, self-assessment and instructors' feedback was developed. Then in order to improve the understanding ability of participants, the questionnaire was converted into two local languages (Amharic and Afan Oromo) and then the three versions were used for data collection [12].

Data collection procedure

The data was collected by 3 BSc midwives and supervised by principal investigator, one MSc Midwife and one MSc (maternity and neonatal nursing with background of midwifery). In order to have access to the real satisfaction, the data collectors and supervisors were selected out of the institutions where the study was conducted [13,14].

Operational definitions

Learner satisfaction: Is the degree to which the students believe that their learning experiences in simulation-based learnings meet their learning needs. In addition to the academic demand factors, the total of thirteen 5-scale likert questionnaires, which adapted from different related studies and guidelines, were used to determine the level of satisfaction. Each item possessed the values from 1 (strongly disagree) to 5 (strongly agree) with the sum of possible satisfaction scores ranging from 13 to 65, of which the average score was 32.5. Then it was categorized based on the average value. The summation of the overall responses of a study participant was done and if it is above the average value (*i.e.* 32.5); the participant was categorized as satisfied learner or vice versa [15].

To check for the internal consistency of those 13 items of satisfaction measurement tool, the reliability analysis was done and the overall Cronbach's alpha value of satisfaction was 0.897, reflecting a very high consistency of the instrument to measure satisfaction. A one sample t-test was run to determine whether the satisfaction score with simulation learning experiences was greater than or equals to an average defined as a satisfaction

score of 32.5. The satisfaction scores were normally distributed as assessed by Kolmogorov-Smirnov test statistics of p-value equals to 0.027 which is lesser than 0.05 [16].

Simulation: Is activities that mimic reality and variously involve role-playing, interactive videos or mannequins that help students learn and allow them to demonstrate decision making, critical thinking and other skills.

Enough number of skill-practicing programs per semester: Is the number of two or more skill-practicing programs per semester.

English language understanding ability:

- The student has to translate into his/her own language using dictionaries, help of teachers and/or from other student to understand a subject's idea.
- The student can understand the message of a subject matter without any help from others or materials.
- The option at which the students chose the midwifery department as their preference to study.

Data analysis

After data collection, the questionnaire was checked for completeness and coded. Then data were entered in to Epi-info version 3.5.3. Then after, the data were exported to, cleaned and analyzed by using SPSS version-20. First descriptive analysis was done and then bivariate analysis was used to find out the association of independent variables with the dependent variable *i.e.* learners' satisfaction. Multivariate logistic regression

analysis was done for variables with p-value<0.2 in binary logistic regression analysis to identify predicting factors of simulation based education by controlling confounding variables at the confidence interval of 95%. The variable with p-value<0.05 in multiple logistic regressions which showed statistically significant association were considered as predicting variable for factors associated with simulation-based education. Odds ratio with 95% confidence interval was used to measure the degree of association between those significant independent variables and learner satisfaction [17].

Results

Socio-demographic characteristics

In this study, two hundred forty one midwifery students were assessed by self-administer pre-tested questionnaire with a response rate of 98.77%, majority of whom had been studying at Haramaya and Dire Dawa universities (95 (39.4%)). In average the study participants were in the mean age of 22.08±1.627 with the largest numbers of students belonging to the age of below 25 years (223 (92.5%)) where the minimum and maximum age scored was 19 and 28 respectively (Table 1). Among the respondents, a hundred thirty four (55.6%) were males and majority of the participants had been studying the class of 4th year (134 (55.6%)) (Figure 1).

Table 1: Socio-demographic characteristics of midwifery students at Harar health sciences college, Haramaya and Dire Dawa universities, Eastern Ethiopia, May 2018 (n=241).

Variables		Frequency	%
Age (in years)	<25	223	0.925
	≥ 25	18	0.075
	Mean and SD: 22.08 ± 1.627		
Gender	Male	134	0.556
	Female	107	0.444
Name of teaching institutions	HHSC	51	0.221
	HRU	95	0.394
	DDU	95	0.394
Year of study	3 rd year	107	0.444
	4 th year	134	0.556

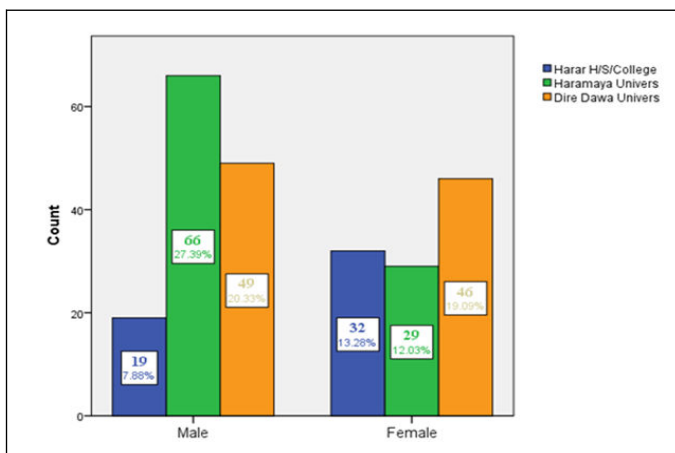


Figure 1: Distribution of study participants by gender.

Academic demand factors

Among 241 study participants, half of them (124 (51.5%)) scored the Cumulative Grade Point Average (CGPA) of greater than the mean value (3.15) (Mean and SD: 3.15 ± 0.394) (Figure 2). Even though the department of midwifery was not their first option to study for a hundred twenty nine (53.5%) of the study participants, most of them (174 (72.2%)) were interested to join and study it. Half of the students who took part in the study need assistance and/or help from others to understand the English language, which is teaching learning language or have the need to translate it into their mother tongue language or other common languages of the country (Table 2).

Table 2: Academic demand factors of learner satisfaction with simulation based education among midwifery students at Harar health sciences college, Haramaya and Dire Dawa university, Eastern Ethiopia, May 2018 (n=241).

Variables		Frequency	%
The rank on which the department was chosen	My first choose	129	53.5
	Not my first choose	112	46.5
Interest to study the profession	Interested	174	72.2
	Not interested	67	27.8
Understanding ability of English language	Need assistance	121	50.2
	Need no assistance	120	49.8

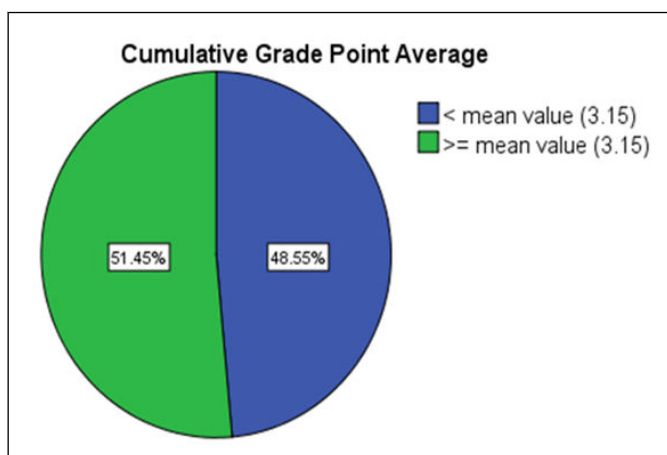


Figure 2: Proportion of study participants by their cumulative GPA based on the mean value.

Level of learner satisfaction with simulation based education

Among two hundred forty one midwifery students who participated in the study, the total of a hundred seventy one (70.95%) answered the aggregate of agree and strongly agree whereas 70 (29.05%) answered the combined disagree and strongly disagree (Figure 3). The findings of this study showed that minimum and maximum satisfaction scores were 19 and 48

respectively whereas the mean satisfaction score was 35.62±5.51 which was higher than the average satisfaction score of 32.5, by statistically significant difference of 3.12 (95% CI, 2.424 to 3.821), t (240)=8.803, p-value=0.027.

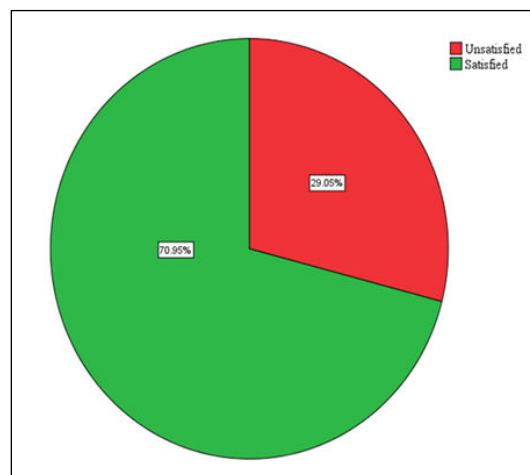


Figure 3: Proportion of learners satisfaction with simulation based education.

Experiences of midwifery students with simulation based education

Among 241 study participants who have asked about their perception about instructors' effort to assist them in order to develop long term skill, 53 (22.0%) of them answered the aggregate of agree and strongly agree (mean=2.52, SD=0.801) whereas only 33 (13.7%) responded a combined agree and

strongly agree with the suitability of way of teaching and their learning styles (mean=2.68, SD=0.900) [18]. Among 241 students, only 33 (13.7%) and 14 (5.8%) answered the aggregate of agree and strongly agree regarding the suitability of way of teaching to their learning styles (mean=2.68, SD=0.900) and availability of enough skill practicing programs per semester (mean=2.73, SD=0.925) respectively (Table 3).

Table 3: Experiences of midwifery students with simulation-based education at Harar health sciences college, Haramaya and Dire Dawa universities, Eastern Ethiopia; May 2018 (n=241).

Variables		Satisfied n (%)	Unsatisfied n (%)	Mean	Std. Dev
Age	<25years	159 (66.0%)	64 (26.6%)	-	-
	≥ 25 years	12 (5.0%)	6 (2.5%)		
Gender	Male	90 (37.3%)	44 (18.3%)	-	-
	Female	81 (33.6%)	26 (10.8%)		
Teaching institutions	HHSC	38 (15.8%)	13 (5.4%)	-	-
	HRU	74 (30.7%)	21 (8.7%)		
	DDU	36 (24.5%)	59 (14.9%)		
Year of study	3rd year	71 (29.5%)	36 (14.9%)	-	-
	4th year	100 (41.5%)	34 (14.1%)		
Cumulative GPA	<3.15	82 (34.0%)	35 (14.5%)	-	-
	≥ 3.15	35 (36.9%)	89 (14.5%)		
The rank at which the department has been chosen	Not first choose	75 (31.1%)	37 (15.4%)	-	-
	1st choose	96 (39.8%)	33 (13.7%)		
Professional interest	Not interested	123 (51.0%)	51 (21.2%)	-	-
	Interested	48 (19.9%)	19 (7.9%)		
English language understanding ability	Need assistance	84 (34.9%)	37 (15.4%)	-	-
	Do not need assistance	87 (36.1%)	33 (13.7%)		
My teacher provides me accurate information about skill requirements	Strongly disagree	9 (3.7%)	5 (2.1%)	2.67	0.768
	Disagree	42 (17.4%)	40 (16.6%)		
	Neutral	94 (39.0%)	21(8.7%)		
	Agree	26 (10.8%)	4 (1.7%)		
My teacher explains learning objectives	Strongly disagree	3 (1.2%)	3 (1.2%)	2.77	0.909
	Disagree	49 (20.3%)	56 (23.2%)		

for simulation learning at the beginning of the period	Neutral	72 (29.9%)	6 (2.5%)		
	Agree	38 (15.8%)	4 (1.7%)		
	Strongly agree	9 (3.7%)	1 (0.4%)		
During skill demonstration, my teacher gives me enough time to meet the objective(s)	Strongly disagree	6 (2.5%)	10 (4.1%)	2.42	0.744
	Disagree	77 (32.0%)	49 (20.3%)		
	Neutral	74 (30.7%)	10 (4.1%)		
	Agree	12 (5.0%)	0 (0.0%)		
	Strongly agree	2 (0.8%)	1 (0.4%)		
During skill demonstration, my teacher assists me in developing a long term skill	Strongly disagree	5 (2.1%)	14 (5.8%)	2.83	0.908
	Disagree	28 (11.6%)	33 (13.7%)		
	Neutral	94 (39.0%)	14 (5.8%)		
	Agree	40 (16.6%)	8 (3.3%)		
	Strongly agree	4 (1.7%)	1 (0.4%)		
During skill demonstration, students' different backgrounds are taken into account	Strongly disagree	1 (0.4%)	12 (5.0%)	2.77	0.838
	Disagree	31 (12.9%)	46 (19.1%)		
	Neutral	100 (41.5%)	5 (2.1%)		
	Agree	37 (15.4%)	7 (2.9%)		
	Strongly agree	2 (0.8%)	0 (0.0%)		
During skill demonstration, the way my instructors taught the simulation is suitable to the way I learn	Strongly disagree	3 (1.2%)	15 (6.2%)	2.68	0.9
	Disagree	36 (14.9%)	48 (19.9%)		
	Neutral	99 (41.1%)	7 (2.9%)		
	Agree	15 (6.2%)	8 (3.3%)		
	Strongly agree	7 (2.9%)	3 (1.2%)		
The teaching methods used in the simulation are helpful and effective	Strongly disagree	2 (0.8%)	13 (5.4%)	2.84	1.118
	Disagree	37 (15.4%)	47 (19.5%)		
	Neutral	94 (39.0%)	4 (1.7%)		
	Agree	38 (15.8%)	6 (2.5%)		
	Strongly agree	0 (0.0%)	0 (0.0%)		
There is enough skill practicing programs per semester	Strongly disagree	3 (1.2%)	12 (5.0%)	2.73	0.925
	Disagree	41 (17.0%)	26 (10.8%)		
	Neutral	117 (48.5%)	28 (11.6%)		

	Agree	9 (3.7%)	4 (1.7%)		
	Strongly agree	1 (0.4%)	0 (0.0%)		
Programs of skill demonstration are flexible and adjustable for simulation class	Strongly disagree	5 (2.1%)	17 (7.1%)	3.05	1.019
	Disagree	16 (6.6%)	27 (11.2%)		
	Neutral	71 (29.5%)	16 (6.6%)		
	Agree	69 (28.6%)	10 (4.1%)		
	Strongly agree	1 (4.1%)	0 (0.0%)		
During skill demonstration, the number of students per teaching groups is small enough and appropriate for my learning	Strongly disagree	41 (17.0%)	12 (5.0%)	2.66	0.696
	Disagree	117 (48.5%)	26 (10.8%)		
	Neutral	9 (3.7%)	28 (11.6%)		
	Agree	1 (0.4%)	4 (1.7%)		
	Strongly agree	3 (1.2%)	0 (0.0%)		
During skill demonstration, I can get necessary help in the use of equipment	Strongly disagree	22 (9.1%)	28 (11.6%)	2.71	0.836
	Disagree	4 (1.7%)	6 (2.5%)		
	Neutral	102 (42.3%)	19 (7.9%)		
	Agree	35 (14.5%)	13 (5.4%)		
	Strongly agree	8 (3.3%)	4 (1.7%)		
During skill demonstration, I can assess my own skill performance critically	Strongly disagree	13 (5.4%)	21 (8.7%)	2.72	1.038
	Disagree	36 (14.9%)	28 (11.6%)		
	Neutral	72 (29.9%)	14 (5.8%)		
	Agree	44 (18.3%)	6 (2.5%)		
	Strongly agree	6 (2.5%)	1 (0.4%)		
My teacher gives me necessary feedback related to my performance within a reasonable period of time	Strongly disagree	8 (3.3%)	14 (5.8%)	2.77	0.891
	Disagree	28 (11.6%)	33 (13.7%)		
	Neutral	96 (39.8%)	14 (5.8%)		
	Agree	37 (15.4%)	9 (3.7%)		
	Strongly agree	2 (0.8%)	0 (0.0%)		

Factors affecting learner satisfaction with simulation-based education

In Bivariate analysis with p-value of less than 0.2, the factors found to be statistically significantly associated with learners' satisfaction with simulation-based education were interest to study the midwifery profession, the accurateness of teachers'

information about the requirement of skill competence, the effort of instructors to assist their learners during skill demonstration, the suitability of way of teaching to the students' learning styles, the availability of enough scheduled skill-practicing program per semester for skill demonstration were the predictors of the learners' satisfaction with simulation-based education at the 95% confidence interval [19].

Among variables found to be significant in multivariate analysis: the perception towards teachers assistance during skill demonstration and practice, the suitability of way of teaching to the learning styles and the number of practicing programs per semester were found to be significantly associated at alpha 5%. The study findings showed that those students who have been assisted by their teachers during demonstration and practice were 5.6 times more satisfied than those who haven't assisted and answered strongly disagree (AOR and 95% CI=5.622 (2.359-13.398), p-value<0.001). The students who perceive that the way their instructors taught the skill demonstration was suitable to their learning styles were 22.4 times more satisfied

with the simulation-based education (AOR and 95% CI=22.391 (10.770-37.529), p-value<0.023). Finally, those students who perceived that number of skill practices per semester is enough were 2.3 times more likely to be satisfied with simulation based education (AOR and 95% CI=2.344 (1.032-5.322), p-value<0.042) (Table 4).

Table 4: Bivariate and multivariate logistic regression analysis of factors associated learners' satisfaction with simulation-based education among midwifery students at Harar health sciences college, Haramaya university, Dire Dawa university, Eastern Ethiopia; May 2018 (n=241).

Variables		Learners' satisfaction				p-value
		Unsatisfied n (%)	Satisfied n (%)	COR (95% CI)	AOR (95% CI)	
Age	<25years	64 (26.6%)	159 (66.0%)	1	-	-
	≥ 25 years	6 (2.5%)	12 (5.0%)	0.805 (0.290-2.237)		
Gender	Male	44 (18.3%)	90 (37.3%)	1	-	-
	Female	26 (10.8%)	81 (33.6%)	1.523 (0.853-2.609)		
Teaching institutions	HHSC	13 (5.4%)	38 (15.8%)	1	-	-
	HRU	21 (8.7%)	74 (30.7%)	1.206 (0.545-2.669)		
	DDU	59 (14.9%)	36 (24.5%)	0.561 (0.264-1.192)		
Year of study	3 rd year	36 (14.9%)	71 (29.5%)	1	-	-
	4 th year	34 (14.1%)	100 (41.5%)	1.491 (0.853-2.69 4)		
Cumulative GPA	<3.15	35 (14.5%)	82 (34.0%)	1	-	-
	≥ 3.15	89 (14.5%)	35 (36.9%)	1.085 (0.622-1.893)		
The rank at which the department has been chosen	Not first choose	37 (15.4%)	75 (31.1%)	1	-	-
	1 st choose	33 (13.7%)	96 (39.8%)	0.697 (0.399-1.218)		
Professional interest	Not interested	19 (7.9%)	48 (19.9%)	1	1	0.375
	Interested	51 (21.2%)	123 (51.0%)	0.955 (1.512-5.781)	1.499 (0.613-3.666)	
English language understanding ability	Need assistance	37 (15.4%)	84 (34.9%)	1	-	-
	Do not need assistance	33 (13.7%)	87 (36.1%)	1.161 (0.665-2.027)		
Information about skill requirements*	Not accurate	45 (18.7%)	51 (21.2%)	1	1	0.012
	Accurate*	25 (10.4%)	120 (49.8%)	4.235 (2.351-7.629)	2.99 (0.276-5.704)	
Perceived assistance during	Not good	47 (19.5%)	33 (13.7%)	1	1	0

skill demonstration and practice**	Good**	23 (9.5%)	138 (57.3%)	8.545 (4.565-15.995)	5.622 (2.359-13.398)	
The way my teacher taught the simulation is suitable to my learning style**	No	63 (26.1%)	39 (16.2%)	1	1	0.023
	Yes**	7 (2.9%)	132 (54.8%)	30.46 (12.907-51.897)	22.39 (10.77-37.529)	
The teaching methods used in the simulation are helpful and effective	No	34 (14.1%)	26 (10.8%)	1	1	0.017
	Yes*	36 (14.9%)	145 (60.2%)	5.267 (2.812-9.886)	5.77 (0.332-7.294)	
Skill practicing programs per semester**	<2 practices	44 (18.3%)	41 (17.0%)	1	1	0.042
	≥ 2 practices**	26 (10.8%)	130 (53.9%)	5.366 (2.949-9.763)	2.34 (1.032-5.32)	

Note: *Show statistically significant association in bivariate logistic regression; **Show statistically significant association in multivariate logistic regression

Discussion

The efforts of teachers in assisting their students during skill demonstration, the suitability of the way of teaching to the learning styles of students and the number of scheduled programs per semester for skill practicing were statistically significant factors with satisfaction in simulation based education. This study found that the proportion of satisfaction with simulation-based education and associated factors is 70.95% which is 16.75% higher than the study conducted at University of Gondar which was 54.2%. This difference could be due to the differences in sample size because that study included only 144 midwifery students. Another difference could be due to that this study followed the multisite approach to have more sample size [20].

However, this finding is 18.75% lower than the studies conducted at King Saud bin Abdulaziz university for health sciences, Saudi Arabia (89.7%) and this could be due to the differences in sample size and socio demographic characteristics of the study participants since the total of 177 nursing and 234 midwifery students were recruited in the study.

And also the proportion of learners' satisfaction from our study is 13.05% lower than the study that conducted among 244 midwifery, 322 nursing and 56 medical students attending obstetrics and gynecology courses at Gjøvik university, Norway (84.0%). This difference might be due to sample size and socio demographic characteristics of participants. Another possible explanation for the difference could be the technological gap between the countries. The finding is also 9.75% lower than the proportion of the study done at Arab American University of Jenin, Palestine (80.7%). This difference could be due to the difference in sample size and socio-demographic characteristics of the study participants *i.e.* 440 nursing and 120 midwifery students were included in the study conducted in Palestine. Another possible explanation could be that the variance in technologies among the study areas.

The factor which was directly associated with learner satisfaction with simulation based education is that the teachers' effort in assisting the learners during skill learning to help them develop a long term skill. This finding is 1.54 times higher than the finding for the factor of the study conducted at university of Gondar but similar to the study done at King Saud bin Abdulaziz university for health sciences, Saudi Arabia. The difference could be due to socio demographic characteristics of participants, the sample size and the current consideration of simulation in to the curricula.

Another factor which shows statistical significance with learner satisfaction with simulation learning was that the suitability of the way of teaching to the learning styles of students. This finding is 1.37 times and twice lower than the findings for the factor study done at King Saud bin Abdulaziz university for health sciences, Saudi Arabia and Kent state university, USA respectively. This difference could be due to socio demographic characteristics of study participants, the sample size and the social, economic and technological difference.

This study also showed that an availability of enough practicing program per semester was significantly associated with learner satisfaction with simulation-based education. This finding is 4.5 times higher than that of the study conducted at university of Gondar. This difference could be due to sample size, socio demographic features of study participants, as well as current curriculum concerned more for simulation.

Conclusion

Currently simulation has become an anticipated and the most important teaching and learning tools in midwifery education and its utilization throughout the globe is increasing from time to time. Determining the perception and satisfaction towards this tool among the learner has been a popular study and so many have been distributed. In Africa, including our country, a

few studies done to assess the learners' perception and satisfaction towards this interactive teaching and learning tool. Most of the studies considered students of medical and other health sciences as a sample or nursing and midwifery as a study population. And also most of the studies done recruited the experts and educationalists in the study along with the students having only qualitative study design. Considering the above gaps, this study tried to determine the level of satisfaction among undergraduate regular midwifery students at three institutions.

The proportion of learner satisfaction with simulation based education is high when compared to previous studies done in our country. Based on this we can expand that the study supports there is an important role of effort of teachers' assistance, the suitable way of teaching to learning styles and the skill practicing program might gratify not only in simulation but also in actual patient care. And this level of satisfaction of simulation based learning among midwifery students is low when compared to recent studies conducted abroad. Therefore, proposing the means to get better teachers' assistance, counter parting the teaching and learning styles at simulation based education as well as planning enough skill practicing periods per semester is recommended.

Regarding the score of the satisfaction measurement tool, a fewer number of students answered agree and strongly agree and most of them responded neutral option. In general, even though the proportion of satisfaction was high the number of students responded the combined agree and strongly agree were fewer than those answered an aggregate of disagree and strongly disagree for each and every satisfaction measurement items. Therefore, creating the means to improve the overall quality of simulation based education is advocated.

Ethical Considerations

Ethical clearance was obtained from institutional research review board of college of health sciences of Mekelle university and an official letter of cooperation, which written by the Mekelle University, college of health sciences, department of midwifery were taken to the administrators of E/Hararge zone and Harari regional health bureau, HHSC, HRU and DDU. Then the supportive letter was obtained from the respective colleges and given to the department of midwifery at each selected college/university. Concerned body from the department of midwifery was officially communicated before conducting the data collection and informed consent from each study participants was obtained. The participants have informed that they have full right to not to participate in the study or to stop participation at any time during the data collection and also the study couldn't impact their academic life in the college/university. Confidentiality of the data has been kept throughout the study.

Recommendations

First of all, we recommend that the midwifery teaching institutions have to work on to improve the overall quality of simulation based education in order to have comparable way of

simulation teaching with the learning styles. Instantly, the instructors have to get better effort to back their students, both during skill demonstration and skill practicing time at clinical area, to develop a long term skill by considering their background learning styles. We will also advocate that the need to offer more times for simulation based learnings as well as skill practicing programs including the information regarding the necessity of skill competence. Lastly we would recommend that further researches including the variables counting different academic stakeholders, materials and skill lab technicians by using mixed method of study design, by eliminating self-administer questionnaire, to be done for better results. It is also better to conduct comparative study or using case-control study design.

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