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Research Article

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Skills Laboratory Implementation Readiness and Associated Students Clinical Performance on Neonatal Resuscitation: A Cross- Sectional Study among Diploma Nursing Schools in Tanzania

Dafrosa H. Haule[1*], Stephen M. Kibusi[2], Secilia K. Ng'weshemi[3], Aziza S. Machenje[4]

*[*1]Department of Nursing and Midwifery, Mvumi Institute of Health Science Chamwino Dodoma*

[2]Department of Nursing and Midwifery, College of Health Science of University of Dodoma

[3]Department of Public Health, College of Health Science of University of Dodoma

[4]Division of Nursing and Midwifery Services Ministry of Health Dodoma

[*]Corresponding Author
Dafrosa H. Haule, Department of Nursing and Midwifery, Mvumi Institute of Health Science Chamwino Dodoma.

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Abstract

Background: *Skills laboratory is one of the most important components in nursing education as it bridges the gap between theory and practice among nursing students.*

Objective: *Assessment of skills laboratory implementation readiness and associated student's clinical performance on neonatal resuscitation among diploma nursing schools in Tanzania.*

Methodology: *The study employed quantitative approach, the study design was cross-sectional. The sample size was 384 students from four regions including; Dodoma, Manyara, Morogoro and Mbeya. Multistage sampling was used to select zones, regions, and district; while proportional sampling and simple random sampling were used to select students in respective schools. Data were collected through self-administered questionnaire, standardized checklist and OSPE checklist and analyzed by statistical packaged for social sciences (SPSS).*

Result: *The study had 384 participants' with56.0% female and 46% male participants. Findings show that 55.6% school had inadequate requirement in terms of furniture, models and infection control requirements. 71.1% of the respondents had good performance on neonatal resuscitation with the mean score of 60.3 %. 60.9% had positive perception toward the use of skills laboratory, and it was found that there is association between SLIR and student clinical performance on neonatal resuscitation with (OR=3.822, CI: 2.306 -6.333, P= 0.000) and (AOR= 0.260, CI: 0.119-0.337, P= 0.001).*

Conclusion: *Most of nursing schools had limited requirements for skill laboratory implementation. The ministry of health training department should ensure that all government and non-government nursing institutions abide to the requirement set that they should have a well- equipped skills laboratory that will impact on students' performance.*

Keywords: Skills Laboratory, Readiness, Implementation, Clinical Performance.

Background

Background Information

Skills laboratory is one of the most important components in nursing education as it bridges the gap between theory and practice among nursing students; considering the fact that nursing is a practice-based profession [1].

In Africa, skill laboratories methodology introduced in 1999 by the Flemish developmental organization to improve clinical competence and quality of health care in system with changes in technology [2].

In Tanzania, all nursing schools are required to have skills laboratory in order to be accredited. The purpose of this is to enrich nurse students with wide range of clinical competence that will prepare them to meet Tanzania's identified health needs. Skills and competency obtained from skills laboratory training on neonatal resuscitation could reduce neonatal mortality rate in Tanzania. It is estimated that there are 25 deaths in every 1,000 live births [3]. 26% of these deaths are caused by asphyxia and could be prevented by improving intra-partum care during delivery [4].

A number of strategies have been initiated to overcome this problem, such interventions are like; Help Baby Breath (HBB), this program has been incorporated in nursing curriculum in Tanzania for the purpose of equipping nursing students with greater skills on neonatal resuscitation, so as to reduce the increase number of neonatal deaths, Despite all efforts that have been done, a number of neonatal mortality due to birth asphyxia is still high, and it is responsible for 23% of neonatal deaths [5]. Therefore, the study will focus on assessing skills laboratory implementation readiness and associated student's clinical performance on neonatal resuscitation among diploma nursing students in Tanzania.

Methods and Material

The aim of this study was to assess institutional readiness on skills laboratory implementation readiness and clinical performance of students on neonatal resuscitation and its association among diploma nursing schools.

This research was a cross-sectional design used quantitative approach, the study population were 3rd year diploma nursing students from selected nursing schools. The researcher was interested in this population because, at this level students have already covered topics in the midwifery modules including neonatal resuscitation in NTA level 6.Furthermore, diploma nurses are the one who form the majority of nursing workforce in Tanzania. This work force is prepared to give direct care to the patients in reproductive health care including labor and delivery. Basing on this fact, nurses are expected to have enough skills on neonatal resuscitation hence reduce neonatal deaths in Tanzania.

Standardized observational checklist with 97 items categorized into nine categories, was used to assess the readiness of the institution on skills laboratory implementation; whereby the researcher checked for adequate or in adequate on each item. Standardized OSPE checklist with 25 instructions was used to assess the clinical performance of students on neonatal resuscitation in the skills laboratory whereby; one –four stations was set and a Scenario were made so as to make the participants know what they were supposed to do. The examination was scheduled for 7 minutes for each participant and they were supposed to show how to perform neonatal resuscitation on the fetal doll.

Data Analysis

After data collection researcher used the statistical packaged for social sciences (SPSS) program for data entry, process and data analysis. Before data analysis, data cleaning was done to check for missing data, accuracy and completeness of information. Demographic information was analyzed using descriptive approach whereby percentage and frequency were measured and the results were presented using graphs and tables.

On analyzing perception of nurse students toward use of skills laboratory, there were 20 questions, and all were positive. Principle factor analysis used to categorize, those below the mean were recorded as negative perception and those above the mean were recorded as positive perception, also descriptive analysis was done and the results were presented by figures and percentage.

Chi square test was used to analyze all categorical data and binary logistic regression analysis was used to analyze the association's categorical data between with significant P-values.

Results

Demographic Information of Study Participants

Data of this study were collected from nine Nursing schools in Tanzania. A total of 384 participant were enrolled in the study.

Table 1: Demographic information of study participants (N=384)

Variable	Frequency (N)	Percentage (%)
Sex		
Male	169	44.0
Female	215	56.0
Age		
<20	2	0.5
20-25	248	64.6
>25	134	34.9
Education level		
O-level	261	68.0
A-level	123	32.0
Residential area		

In-campus	243	63.3
off-campus	141	36.7
Institution of study		
Government	132	34.4
Non-government	252	65.6
Sponsors		
your self	218	56.8
Parent/guardian	149	38.8
NGOs	7	1.8
Others	10	2.6
Nursing experience		
in-service	159	41.5
pre-service	224	58.5

Skills Laboratory Implementation Readiness among Diploma Nursing Schools.

It was found that; majority of the school were inadequate by 5(55.6%) with only 4(44.4%) had adequate requirement for implementing skills laboratory.

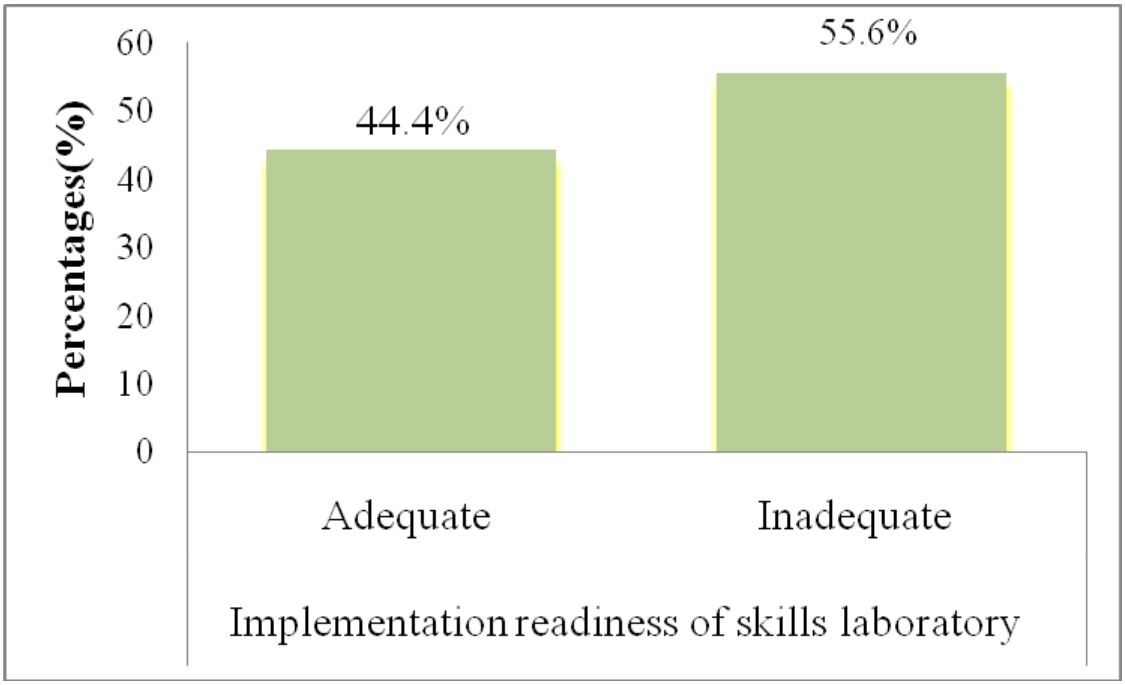

Figure 1: Distribution of requirements for skills laboratory implementation readiness among nursing schools (n=9)

Distribution of Essential Requirement for Skills Laboratory Implementation at the area where a Study was Done.

It was found that majority of schools (colleges) had adequate requirements in term of general requirement for running skill laboratory, equipment for neonatal resuscitation (HBB), models, reproductive health requirements, availability staffs or personnel and laboratory maintenance by 8(88.9%), 5(55.6%), 5(55.6%), 5(55.6%), 5(55.6%) and 7(77,8%) in that order respectively. However, it was found that large number of school 7(77.8%) had inadequate equipment in term furniture and 5(55.6%) of schools with inadequate infection control equipments.

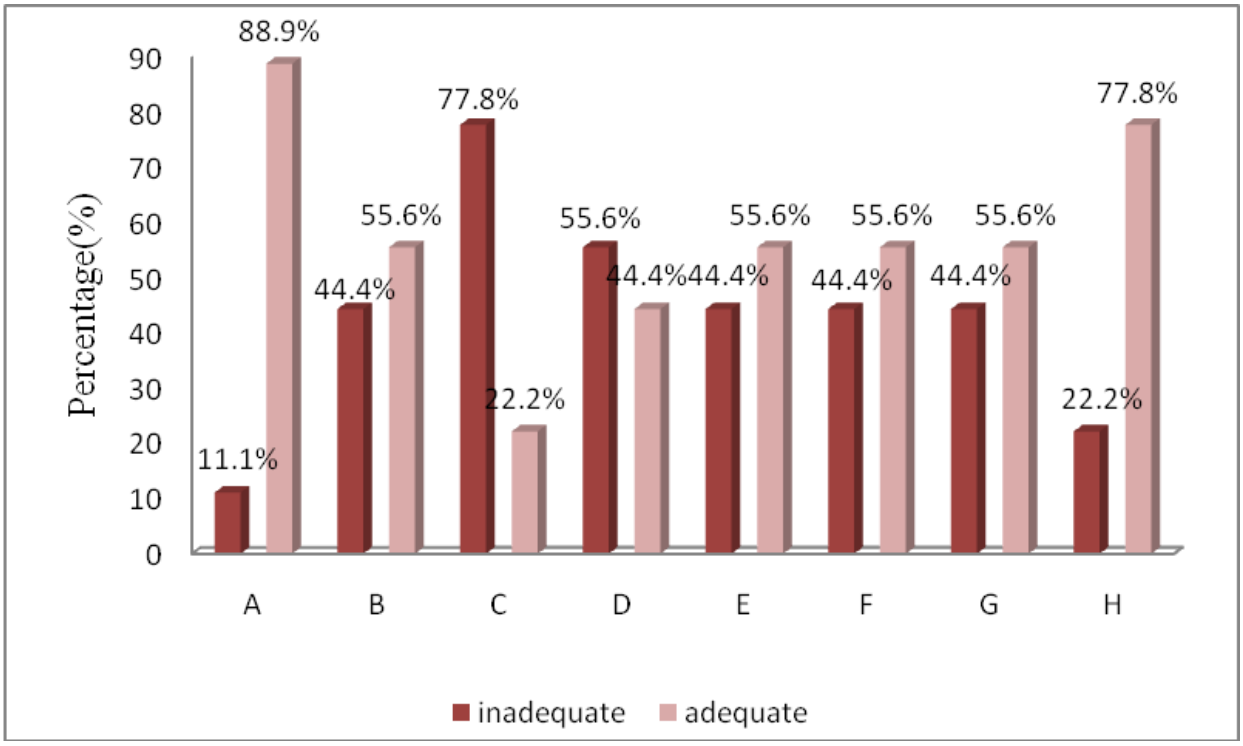

Figure 2: Distribution of essential requirement for implementing skills laboratory in the area where a study was done

Key: A= General requirement for running skill laboratory, B= Equipments for Neonatal Resuscitation (HBB), C=Available furniture's, D= Infection Control equipments, E= Available models, F= reproductive health requirement, G= Staffs or Personnel and H= Laboratory Maintenance.

Clinical Performance of Students on Neonatal Resuscitation (HBB).

Distribution of Students' Score from Objective Structured Practical Examination on Neonatal Resuscitation (HBB).

Table 1: Shows that the mean score of respondents was 60.3 % with standard deviation of 17.7% of score and medium score of 64%. Also majority of the participants scored 72% with minimum of 4% and maximum score of 92% respectively.

Table 2: Distribution of student score from OSPE on neonatal resuscitation (HBB)

Variable	Categorical variable	Measure of central tendency%
	Mean	60.3
Score on neonatal resuscitation	Median	64
	Mode	72
	Standard deviation	17.6
	Minimum	4
	Maximum	92

Distributions of level of performance on neonatal resuscitation were majority of them 137(71.1%), passed the examination while few of them 113(28.9%) had failed the examination.

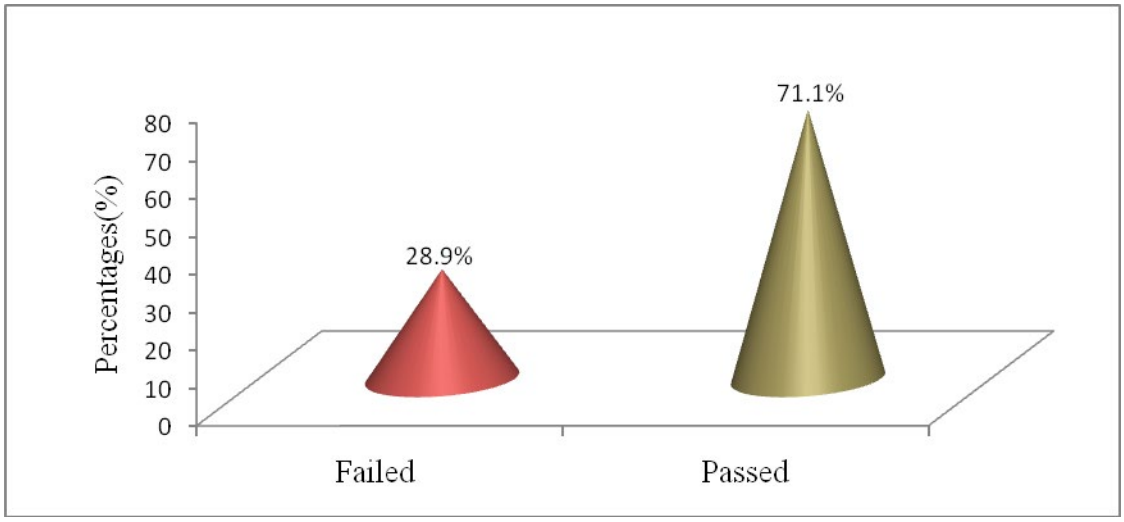

Figure 3: Distribution of students' level of performance from objective structured practical examination on neonatal resuscitation (HBB)

Association Between Demographic Characteristics of the Study Participants with Clinical Performance of Students on Neonatal Resuscitation (HBB).

Association between institutional SLIR and performance in the neonatal resuscitation it was found that 74% of students who were coming from schools with adequate requirements were less likely to fail than those who were coming from adequate school (OR=3.822, CI: 2.306 -6.333, P= 0.000) and (AOR= 0.260, CI: 0.119-0.337, P= 0.001).

Association between resident area and performance on neonatal resuscitation, it was found that , students who were living in-campus were two times more likely to pass than those who were living off campus (OR=0.503, CI: 0.320 -0.791, P= 0.003) and (AOR= 1.921, CI: 1.224- 3.015, P= 0.005).

Also association between sex of the respondent and performance on neonatal resuscitation, it was found that female students were 1.4 times more likely to pass than male students (OR=1.663, CI: 1.065-2.596, P= 0.025) and (AOR= 1.486, CI: 0.928-2.365, P= 0.009).

Also association between nursing experience and performance on neonatal resuscitation, it was found that students who were pre-service were 28% less likely to pass than those who were in- service (OR=0.539, CI: 0.339-0.861, P= 0.010) and (AOR= 0.723, CI: 0.476-0.948, P= 0.004).

Table 3: Binary logistic regression analysis of the association between SLIR and demographic characteristics of the study participants with clinical performance of students on neonatal resuscitation (HBB)

Variable	OR	95% CI		P-Value	AOR	95% CI		P-Value
		Lower	Upper			Lower	Upper	
Institutional readiness								
Inadequate	Ref				Ref			
Adequate	3.822	2.306	6.333	0.000	0.260	0.119	0.337	0.001
Resident area								
Off- campus	Ref				Ref			
In-campus	0.503	0.320	0.791	0.003	1.921	1.224	3.015	0.005
Sex								
Male	Ref				Ref			
Female	1.663	1.065	2.596	0.025	1.486	0.928	2.365	0.099
Nursing experience								
Pre-service	Ref				Ref			
In-service	0.540	0.339	0.861	0.010	0.723	0.476	0.948	0.004

Discussion

Concerning skills laboratory implementation readiness, it was found that 55.6% of the schools had inadequate requirements for skills laboratory, in terms of furniture, infection control requirements, and equipment for neonatal resuscitation, charts and models. Besides, most of the schools were adequate in terms general requirements like: skills laboratory space, sink and running water, staffs/ personnel and skills laboratory maintenance.

These findings could be due to the requirement of regulatory bodies' which insist that each nursing school should have a well equipped skills laboratory for them to be accredited.

The findings herein are similar with the study done by which found that, there were inadequate physical environment like space, lack of equipment with the need to reuse the old and outdated equipment [6].

The findings presented in this study were found to be similar with the study done by which found that skill laboratories do not have adequate space. Simulation equipment is inadequate and opportunity for individual hand on practice was also inadequate [7]. In the study by Fortune, 79.5% of participants complained that duration and frequency of skill lab session was inadequate.

However this study is incompatible with a study which was done by at Bomet medical training college in Kenya which was found that majority of the respondents agreed that skill laboratory had equipment they needed [2]. 84.4% of respondent agreed that skill laboratory trainers were knowledgeable; such different might be due to different in the methods of obtaining the sample size.

Regarding clinical performance on neonatal resuscitation, it was found that 71.1% of students passed their examinations. These findings could be due to the fact that most of the schools had HBB kit at their skills laboratory and students had opportunity to practice their skills.

The finding of the current study is similar with study done by in Kenya medical training college on innovative application of skill laboratory methodology [8]. According to Amanya, majority of students (74.4%) were competent in doing neonatal resuscitation.

Conclusion

This study found that, Majority of the schools had inadequate requirements for implementation of skills laboratory, especially furniture and requirements for infectious control and prevention. Some of the schools were adequate in particular requirements like general requirements including adequate room and good environment. Furthermore, the skills laboratory has an important contribution in clinical performance among students. Students with adequate requirements for skill laboratory performed better from objective structured practical examination on neonatal resuscitation.

List of Abbreviations

CBET - Competence Based Education Training, CSL- Clinical Skills Laboratory, DCT - Dioceses of Central Tanganyika, I-TECH -International Training and Education Center for Health, JPEIGO -John Hopkins Program for International Education in Gynecology and Obstetrics , KBET- Knowledge Based Education Training, MOHCDGCE- Ministry of Health Community Development Gender Elderly and Children, NACTE- National Council for Technical Education, NTA - National Technical Award, SLIR-Skills Laboratory Implementation Readiness, SPSS-Statistical Packaged For Social Sciences, TNMC -Tanzania Nurses and Midwifery Council, TPG -Theory- Practice Gap

Declarations

Ethical Approval and Consent to Participate

Ethical clearance was obtained from UDOM research publication committee. Permission letter to conduct the study in the selected schools was sought from The University of Dodoma finally the respective principals from the schools were informed clearly on the aim of the study by oral and written consent. Informed consent was obtained from students to participate in the study, each student was given an information sheet explaining the purpose of the study, and the questionnaire was anonymous in order to maintain confidentiality. Data collected was only accessible to the researcher, supervisors and the University of Dodoma for academic purpose; the results from OSPE shared to the school academic and the principle but it was not included on the student's continuous assessment. The data collected were strictly confidential.

Consent for Publication

Not applicable

Availability of Data and Materials

The dataset used and /or analyzed during the current study are available from corresponding author on reasonable request.

Competing of Interests

The author declares that there was no conflict of interest.

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There was no external source of funding used for this study.

Author's Contributions

SMK senior supervisor assisted in data analysis, SKN and ASM contributed to the interpretation of data. All authors read, commented on and approved the final manuscript.

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