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**Public Health**

# Self-Assessment of Final Year Medical Students' Proficiency at Basic Procedures

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## Abstract

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**Key words:** Self-assessment; Procedures; Proficiency; Participation; Nigeria.

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**BACKGROUND:** Procedural tasks are important in patient management, with varying degrees of proficiency expected at different levels of medical training. Little has been done in this region to assess the medical students' proficiency at performing basic procedures.

**AIM:** The aim of this study is to determine their self-assessed proficiency, degree of participation in performing these procedures and the use of skill-lab training.

**MATERIALS AND METHODS:** The study is questionnaire-based, amongst final year medical students of University of Lagos, Nigeria.

**RESULTS:** One hundred and forty students participated in the study. A significant number (82{58.6%}) self-reported level of proficiency for venepuncture was above average or excellent; for IV line placement it was a little less than half (65{46.4%}) and for urethral catheterisation 44 (31.7%); however it was quite low for the other procedures. Many students self-reported high level of participation for venepuncture (83{59.2%}); sixty one (43.6%) for IV line placement and 30 (21.7%) for urethral catheterization. The correlations between self-assessed levels of proficiency and participation were significant for all procedures. There was no exposure to the use of mannequins.

**CONCLUSION:** Self-reported proficiency is lacking for basic procedures in a significant proportion of students with a low level of participation.

## Introduction

Intricately woven into the practice of medicine are several procedures ranging from the very simple to the extremely complex ones. Procedural tasks are very important diagnostic and therapeutic tools in patient management [1]. Varying degrees of proficiency in procedures is expected at various levels of medical training- from undergraduate years through completion of postgraduate training to post-specialization practice. Some of these procedures are routinely performed and therefore should be done competently [2, 3]. Technical expertise has been described as one of the sides of the coin of good medical care and a patient's trust is usually grounded in their physician's technical expertise [4]. During undergraduate training some of these procedures which are considered foundational in medical practice are emphasized and students are expected to achieve some proficiency in them. The process of acquiring,

developing and refining technical skills in medicine has evolved from the traditional "see-one, do-one" approach to an active learning process with initial skill-lab training and subsequent decreasing levels of supervised bedside support [5, 6]. Undergraduate and postgraduate medical curriculum planners all over the world, continuously aim at improving the teaching of clinical skills to students in order to ensure high competence of medical doctors [7, 8].

In Nigeria, undergraduate medical education lasts six years with an initial 3 years of pre-clinical training in basic medical sciences and later 3 years of clinical training. During the clinical years, students rotate through various clinical and medical laboratory specialties and are expected to acquire basic procedural diagnostic and therapeutic skills. While theoretical and clinical skills are periodically evaluated, procedural skills are not formally evaluated. Assessments are made based on log

books kept by the medical students. The actual proficiency of the students is thus not known and there is no formal guidance on what is the acceptable level of competence at various levels of undergraduate training. Little has been done in this region to assess the medical students' proficiency at performing procedures.

The aim of this study is to determine the self-reported proficiency of final year medical students at basic technical procedures, the degree of participation they have had in performing these procedures and the availability and use of skill-lab training.

**Materials and Methods**

This is a cross-sectional descriptive study of final year medical students at the College of Medicine, University of Lagos, Lagos conducted in March 2014. A self-administered, structured questionnaire with both open and close-ended questions were given to the participants after pre-testing and following approval from the health research and ethics committee of the Lagos University Teaching Hospital. Data collected were the participants' age, gender and level of training. The students were asked to assess themselves on the level of proficiency at performing venepuncture, intravenous line placement, nasogastric tube insertion, urethral catheterisation, suturing of laceration and normal vaginal delivery on a Likert scale from extremely poor (scored 1) to excellent (scored 5). They were also asked questions on the extent of supervision on the above procedures, from never taught (scored 0) to performed without supervision (scored 6). They were also asked if they had any skills training using mannequins before performing a procedure on a patient and to specify which ones.

The data were entered into Microsoft excel data base and cross validated by another person. The relevant information was exported into the SPSS version 20 statistical package which was used for analysis. Continuous data was presented as Mean  $\pm$  SEM, while categorical data was presented as median. The data were also presented as tables and graphs. Spearman's rank correlation coefficients between self-assessed level of proficiency and level of participation were computed for the six basic procedures. Two-tailed probability values  $<0.05$  were considered statistically significant.

**Results**

One hundred and forty two questionnaires were distributed. One hundred and forty (98.6%) were completed and returned, which were all included in analyses. A ninety seven percent (1900/1960) response rate was given of all questions asked.

Eighty seven (62%) of the respondents were males

while 49 (36%) were females giving a male to female ratio of 1.8:1. The respondents ranged in age from 19 to 34 years with a mean of  $23 \pm 0.3$  years and a median of 22 years.

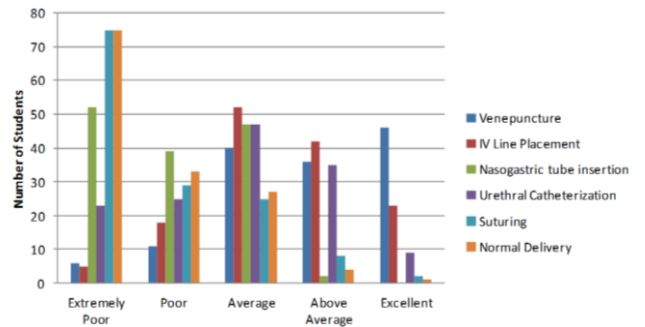


Figure 1: Self-assessed level of proficiency at basic procedures.

The procedure for which more than half of students' self-assessed level of proficiency was above average or excellent was venepuncture (82{58.6%}); for IV line placement it was a little less than half (65{46.4%}) and for urethral catheterisation 44 (31.7%). Very few students believed their proficiency was good in performing nasogastric tube insertion, suturing or normal delivery (Figure 1). Seventy five (54%) students believed they were extremely poor in suturing or carrying out normal delivery and 52 (37.1%) in nasogastric tube insertion (Figure 2). Ninety one (65%) students rated themselves poor or extremely poor at inserting a nasogastric tube.

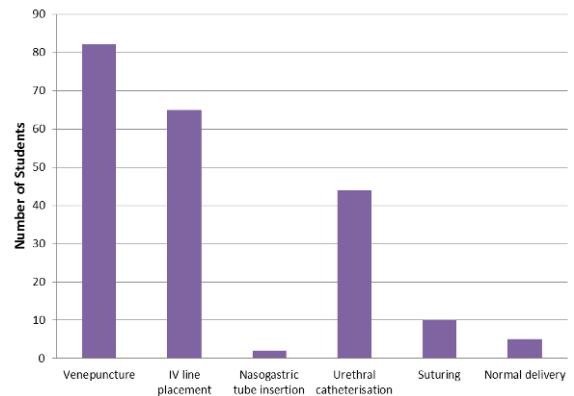


Figure 2: Self-assessed level of proficiency of above average or excellent.

Many students self-reported high level of participation i.e. performed without or with supervision in carrying out venepuncture (83{59.2%}); sixty one (43.6%) for IV line placement and 30 (21.7%) for urethral catheterisation. Very few students had high level of participation in nasogastric tube insertion, suturing or normal delivery (Figure 3). Seventy two (51.4%) students claimed they were never taught suturing; 42 (30%) nasogastric tube insertions and 31(22.3%) normal delivery.

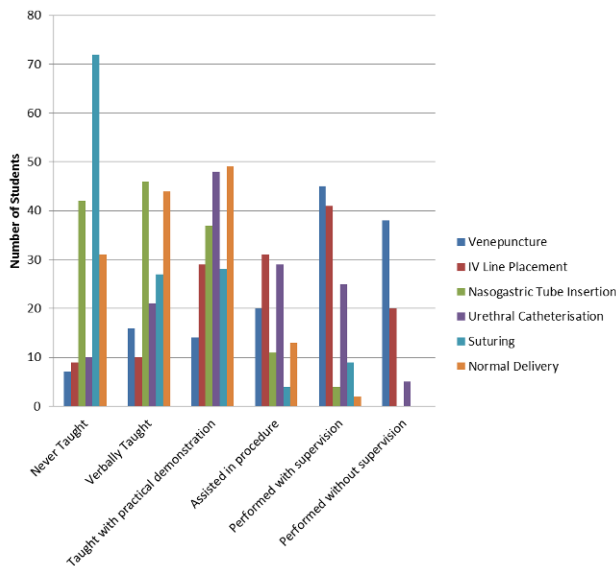


Figure 3: Self-assessed level of participation at basic procedures.

The correlations between self-assessed level of proficiency and level of participation were significant for all procedures in this study with  $p < 0.05$  (Tables 1 and 2).

Table 1: Correlations of self-assessed proficiency and participation for venepuncture, iv line placemen and nasogastric tube insertion.

Spearman's rho	Venepuncture Level of Proficiency	Correlation Coefficient	1.000	1.000
		Sig. (2-tailed)	.	0.000
	Venepuncture Level of Participation	Correlation Coefficient	0.447	1.000
		Sig. (2-tailed)	0.000	.
		N	139	140
Spearman's rho	IV line placement Level of Proficiency	Correlation Coefficient	1.000	0.498
		Sig. (2-tailed)	.	0.000
	IV line placement Level of Participation	Correlation Coefficient	0.498	1.000
		Sig. (2-tailed)	0.000	.
		N	140	140
Spearman's rho	Nasogastric tube insertion Level of Proficiency	Correlation Coefficient	1.000	0.384
		Sig. (2-tailed)	.	0.000
	Nasogastric tube insertion Level of Participation	Correlation Coefficient	.384	1.000
		Sig. (2-tailed)	.000	.
		N	140	140

None of the students were exposed to the use of a skill-lab or mannequin for the performance of these basic procedures.

Table 2: Correlations of self-assessed proficiency and participation of urethral catheterisation, suturing and normal delivery.

Spearman's rho	Urethral catheterisation Level of Proficiency	Correlation Coefficient	1.000	0.631
		Sig. (2-tailed)	.	0.000
	Urethral catheterisation Level of Participation	Correlation Coefficient	0.631	1.000
		Sig. (2-tailed)	0.000	.
		N	138	138
Spearman's rho	Suturing Level of Proficiency	Correlation Coefficient	1.000	0.476
		Sig. (2-tailed)	.	0.000
	Suturing Level of Participation	Correlation Coefficient	0.476	1.000
		Sig. (2-tailed)	0.000	.
		N	139	140
Spearman's rho	Normal delivery Level of Proficiency	Correlation Coefficient	1.000	.522
		Sig. (2-tailed)	.	.000
	Normal delivery Level of Participation	Correlation Coefficient	0.522	1.000
		Sig. (2-tailed)	0.000	.
		N	140	139

## Discussion

Self-reported level of proficiency or confidence can be an indicator to assess competence despite limitations in their correlations [11, 12]. Confidence at carrying out procedures is also an independent variable that affects performance and thus a valuable factor to target [13].

Significant number of students in our study believe they are above average and thus have a readiness to perform venepuncture, and a large number of students felt comfortable with IV line placement in contrast to findings by Karim et al in Kuwait, Chen et al in Taiwan and Agrawal et al in Nepal where majority of the students had low self-confidence at carrying out the same procedures [1, 14, 15].

A low number of respondents (31.7%) felt proficient enough to perform urethral catheterization. This is comparable to findings by Popoola et al in Nigeria but in contrast to findings by Chen et al in Taiwan, Dehmer et al in North Carolina, USA where a higher percentage of students self-reported high confidence level [1, 16, 17].

It is noteworthy that a considerable number of students rated themselves extremely poor or poor in performing nasogastric tube insertion, a relatively simple procedure in contrast to studies in Taiwan and the United States [1, 16]. Most students scored themselves low at suturing in contrast to findings by Dehmer et al. [16].

Majority of the respondents rated themselves extremely poor at performing normal delivery in clear contrast to a study by Nitsche et al at Winston-Salem, North Carolina where most respondents have high confidence level [18].

Teaching and supervision is the foundation for acquiring skills required for performing basic medical procedures. While the amount of work done is important in improving the level of proficiency, the quality or level of supervision is also a very important factor<sup>1</sup>. In this study it is noted that the self-reported level of proficiency in all the basic procedures were significantly correlated to the level of participation. This finding is similar to those of other studies worldwide [1].

In our study we observed that there was no skill-lab or use of mannequins for simulation training for training in these procedures. However studies have shown, worldwide that simulation training of medical students markedly improves self-assessment of proficiency and readiness to perform procedures and its integration into the clinical year's curriculum cannot be overemphasized [18-21].

In conclusion, self-reported proficiency and readiness to perform common basic procedures is lacking in a significant proportion of students. In this study it has been demonstrated that a large number of students have low level of participation and supervision for many procedures; and that for those whose level of participation was good their self-assessed level of proficiency (self-reported confidence) was higher. It is thus necessary to modify our approach to teaching and learning basic procedures to improve their proficiency by increasing the level of participation. Students should be more involved with their trainers with more emphasis on close observation and feedback. There is also the need for the introduction of simulation-based skill-lab training in our environment.

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