Research

Evaluation of the impact of undergraduate use of clinical skills laboratory on House-Officers' (Medical Interns) skills in Port Harcourt, Nigeria

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Abstract

Background: Use of sophisticated technology should be complementary to clinical skills. A decline in these skills in both developed and developing climes has been observed. The aim of this study therefore was to ascertain the opinion of newly qualified Medical Doctors (House Officers) on the impact of the use of clinical skills laboratory during undergraduate medical training in Port Harcourt in the year 2021.

Materials and Methods: A cross-sectional descriptive study was carried out among newly qualified Medical Doctors working in two Teaching Hospitals in Port Harcourt, using a self-administered questionnaire; data was collated and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

Results: The mean age of the respondents was 27.94±3.05 years. The mean knowledge score of non-technical clinical skills was 30.28±2.27. The mean knowledge score of technical clinical skills was 65.29 ± 3.56. Seventy-three (70.0%) respondents had clinical skills laboratory in their medical school, and 60 (66.7%) underwent some formal training in clinical skills laboratory. While the first experience at clinical practice on patients was exciting for 60 (66.7%) respondents, it was full of struggles/difficulty for 28 (31.1%) respondents.

Conclusion: Although majority of the respondents had above average scores for both technical and non-technical clinical skills, some deficiencies were observed in some technical clinical skills where the scores were comparatively low. Some interns had never been exposed to clinical /simulator skills laboratory. We recommend the establishment of clinical skills/simulator laboratory as educational resources in training institutions where this is not available.

Keywords

Clinical skills laboratory, usage and impact, newly qualified doctors, Port Harcourt, Nigeria

Introduction

Clinical skills, as important as it is to medical education and practice, is a terminology that differs in meaning and scope in different quarters.[1, 2] The scope can be as short as obtaining clinical history, performing a physical examination, and counselling.[3, 4] It may also be very broad in scope (clinical/practical skills, communication skills, information technology and computer assisted learning), and broad user setting (medical and nursing students, junior doctors, consultants and other health care workers).[5,6] Local or regional educational requirements and logistics seem to model the form in use[7]. Global best practice advocates for a shift towards evidence-based teaching of clinical skills from the traditional Halstedian approach of "see one, do one, and teach one", due to its inherent advantages of increased safety, quality, and accountability.[8,9] Although simulation is known to be more evidence-based and builds skills, medical training is also known to be an apprenticeship, and so cannot be completely devoid of the Halstedian

approach. Inclusion of the skills laboratory therefore boosts skills among undergraduate and post-graduate medical/surgical trainees alike.[10,11,12] Deficiency of basic clinical skills was reported among majority of pre-registration House Officers in London - United Kingdom, at the time of entering the Medical Register, following a test of Objective Structured Clinical Examination (OSCE).[13]

Improved understanding of disease pathogenesis from available sophisticated technology should complement clinical skills; however, a decline in these skills in developing climes like Africa has been observed.[14,15] Positive and diverse impact was reported among nursing students following exposure to clinical skills laboratory, necessitating recommendations for its inclusion in the curriculum.[16] Establishment of the first center for simulation and skills training, following Rwandan-Canadian partnership, was reported to have resulted in 2,377 learning-encounter (822 hours of training) in 13 months with associated significant impact among Rwanda's health professionals.[17] Similar use of clinical skills laboratory among medical students resulted in significant improvement in students' preparation for examinations in South Africa.[18] In Lusaka - Zambia, improvement in skills and self-perceived competence were observed among final year medical students exposed to clinical skills laboratory, however, some essential skills needed for emergencies were reported to be deficient.[19] In Nigeria, a weak correlation was reported between real life environment and performances in skills laboratory, with overwhelming students' numbers being a significant constraint.[20]

In our environment, we observed some deficiency in synthesizing information derived from patient's clinical history and clinical examination to arrive at evidence-based diagnosis among newly qualified doctors. This was often obvious when a house officer clerked and presented a new patient to a consultant in the clinic or ward setting. Also of concern was the observation of these young physicians making diagnosis from ultrasound findings that did not correlate with the clinical presentation of the patient. There has been a shift from the traditional method of examination, and thus the training has also been restructured in that direction, to help students to prepare for and pass their examinations. Current examination processes no longer require the medical student to clerk and examine a patient in long case during undergraduate clinical examinations. Could this have contributed to the observed decline in clinical acumen? Would the use of simulation help? This study therefore evaluated the self-perceived knowledge of newly qualified medical doctors in clinical and non-clinical skills, and their experience following the use of a clinical skills laboratory.

Methods

Study area: These were the University of Port Harcourt Teaching Hospital and the Rivers State University Teaching Hospital located in Port Harcourt the capital of Rivers State, being one of the Niger Delta states in the Federal Republic of Nigeria. The choice of these two Teaching Hospitals (Federal and State-owned) was based on their involvement in the training of medical students in Port Harcourt, where the researchers are domicile.

Research design: A cross-sectional descriptive design was adopted for the study.

Study population: Newly qualified House Officers working in the two Teaching Hospitals in Port Harcourt constituted the study population.

Bias: Although an independent evaluation of the knowledgebase of these young medical doctors may be ideal option, we believe that the respondents know themselves better and should be able to provide information that would constitute vital evidence-base that would contribute to the existing body of knowledge, and subsequently improve their practice.

Sample size determination: Total population of House Officers (Medical Interns) in both institutions was used.

Sampling method: All the House Officers in the two Teaching Hospitals in Port Harcourt who gave consent were included in the study.

Study instrument: Self-administered semi-structured questionnaires were used for data collection for the study.

Data Analysis: Information on socio-demographics, knowledge of non-clinical skills, knowledge of clinical skills, experiences of House Officers with the knowledge obtained, and the opinion of House Officers on the frequency of use of clinical skills laboratory for undergraduate medical training, were collated. For the non-clinical skills, an evaluation tool of 7 variables was used on a scale of 1 to 5 (no skill, low skill, average skill, above average skill, exceptionally outstanding skill). A respondent could have a minimum knowledge score of 7 and maximum score of 35. The clinical skill was evaluated using a tool of 18 variables scored on a scale of 1 to 5 (no skill, low skill, average skill, above average skill, exceptionally outstanding skill). A minimum knowledge score of 18 and maximum score of 90 was achievable. Data obtained was analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0.

Validity/Reliability of Instrument: The study instrument was scrutinized by all authors, pre-tested in a similar work environment and corrections made before commencement of study. The Cronbach alpha test was done and yielded a value of 0.66.

Results

A 97.0% questionnaire retrieval was achieved and a total of ninety (90) respondents were involved in the study out of 93 House officers in both institutions at the time of the study.

Table 1. Socio-demographic characteristics of respondents (n = 90)

Variables	Number (n)	Percent (%)
Sex		
Male	53	58.9
Female	37	41.1
Age (Mean = 27.94±3.05; Min = 24, Max=38)		
21 - 25 Years	21	23.3
26 - 30 Years	55	61.1
31 years and above	14	15.6
Marital Status		
Single	65	72.2
Married	25	27.8
Educational Qualification		
First Degree	90	100.0
Religion		
Christianity	88	97.8
Islam	2	2.2
Medical School of training		
Foreign Trained	43	47.8
Nigerian Trained	47	52.2
Period of practice (Post qualification)		
6 months	45	50.0
7months	2	2.2
11months	9	10.0
12months	34	37.8

The socio-demographic information of the respondents is shown in Table 1. 53(58.9%) were males and 37(41.1%) were females. The mean age (years) of the respondents was 27.94±3.05, with a minimum of 24 years and maximum age of 38 years. Some 43(47.8%) of the respondents were foreign-trained and 47(52.2%) were trained in Nigeria. Half (50.0%) have practiced for 6months (post qualification), 2 (2.2%), 9 (10.0%) and 34 (37.8%) have practiced for 7months, 11months and 12months respectively.

Table 2. Knowledge of non-technical and technical clinical skills during undergraduate/Houseman-ship (n = 90)

Non-technical Skills	No skill	Low skill	Average skill	Above Average skill	Exceptionally Outstanding skill
	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Leadership	0 (0.0)	2 (2.2)	18 (20.0)	44 (48.9)	26 (28.9)
Teamwork	0 (0.0)	0 (0.0)	17 (18.9)	35 (38.9)	38 (42.2)
Communication	0 (0.0)	0 (0.0)	7 (7.8)	37 (41.1)	46 (51.1)
Obtaining informed consent	0 (0.0)	0 (0.0)	2 (2.2)	32 (35.6)	56 (62.2)
Situation awareness	0 (0.0)	0 (0.0)	15 (16.7)	48 (53.3)	27 (30.0)
Decision making	0 (0.0)	0 (0.0)	9 (10.0)	44 (48.9)	37 (41.1)
Awareness of personal limitation	0 (0.0)	0 (0.0)	6 (6.7)	31 (34.4)	53 (58.9)

Mean knowledge score of non-technical clinical skills = 30.28 ± 2.27; Min = 25, Max=35

Self-evaluation of Clinical Skill	No skill	Low skill	Average skill	Above Average skill	Exceptionally Outstanding skill
	Num (%)	Num (%)	Num (%)	Num (%)	Num (%)

Obtain full and relevant clinical history from patient	0 (0.0)	0 (0.0)	2 (2.2)	20 (22.2)	68 (75.6)
Record and present patient history to medical colleagues in a professional manner	0 (0.0)	0 (0.0)	3 (3.3)	26 (28.9)	61 (67.8)
Carry out a complete physical examination on any patient	0 (0.0)	0 (0.0)	3 (3.3)	27 (30.0)	60 (66.7)
Identify abnormal symptoms and signs in the patient	0 (0.0)	0 (0.0)	23 (25.6)	41 (45.6)	26 (28.9)
Examine and identify abnormalities in the patient urine specimen	0 (0.0)	0 (0.0)	49 (54.4)	35 (38.9)	6 (6.7)
Perform venipuncture to obtain blood specimen	0 (0.0)	0 (0.0)	32 (35.6)	54 (60.0)	4 (4.4)
Give safe intramuscular injections	0 (0.0)	2 (2.2)	31 (34.4)	53 (58.9)	4 (4.4)
Carry out a naked-eye examination of patients' sputum and stool specimen, identify and comment appropriately on any discernible abnormalities	0 (0.0)	0 (0.0)	66(73.3)	19 (21.1)	5 (5.6)
Take patient's temperature orally, rectally and auxiliary and understand the advantages and limitations	0 (0.0)	0 (0.0)	0 (0.0)	15 (16.7)	75 (83.3)
After clerking, make a list of the likely diagnoses and differential diagnoses based on findings	0 (0.0)	0 (0.0)	1 (1.1)	27 (30.0)	62 (68.9)
Request appropriate investigations to confirm likely diagnosis or exclude differential diagnosis	0 (0.0)	0 (0.0)	1 (1.1)	15 (16.7)	74 (82.2)
Perform basic life support	0 (0.0)	3 (3.3)	55 (61.1)	31 (34.4)	1 (1.1)
Insert a urinary catheter	0 (0.0)	3 (3.3)	37 (41.1)	49 (54.4)	1 (1.1)
Insert a nasogastric tube	0 (0.0)	3 (3.3)	32 (35.6)	52 (57.8)	3 (3.3)
Take a throat swab	0 (0.0)	86 (95.6)	3 (3.3)	1 (1.1)	0 (0.0)
Collect a femoral blood sample	0 (0.0)	88 (97.8)	2 (2.2)	0 (0.0)	0 (0.0)
Perform an electrocardiograph	0 (0.0)	89 (98.9)	1 (1.1)	0 (0.0)	0 (0.0)
Perform peak expiratory flow rate	0 (0.0)	89 (98.9)	1 (1.1)	0 (0.0)	0 (0.0)

Mean knowledge score of technical clinical skills = 65.29 ± 3.56; Min = 53, Max = 73

Table 2 shows the respondents' knowledge of non-technical and technical clinical skills during undergraduate/Houseman-ship. The mean knowledge score of non-technical clinical skills during undergraduate/Houseman-ship was 30.28±2.27, with the minimum score being 25 and maximum score 35. Majority (94.4%) of the respondents felt they had a high knowledge of non-technical clinical skills. By their personal assessment, forty-six (51.1%), 56 (62.2%) and 53 (58.9%) respondents felt that they had "exceptionally outstanding skill" in communication, obtaining informed consent, and awareness of personal limitation skills respectively. The mean knowledge score of technical clinical skills during undergraduate medical training was 65.29 ± 3.56, with a minimum of 53 and maximum score was 73. Half (50.0%) of the newly qualified doctors equally have both a high and average knowledge of technical clinical skills during undergraduate medical training. However, there was low score (low skill) for taking a throat swab, collecting femoral blood sample, performing an electrocardiograph and performing peak expiratory flow rate, among majority (95.6%, 97.8%, 98.9% and 98.9%) of the respondents.

Table 3. Clinical skills laboratory for undergraduate trainees (n = 90)

Variables	Number (n)	Percent (%)
Knowledge Score on Non-Technical Clinical Skills		
Average	5	5.6
High	85	94.4
Knowledge Score on Technical Clinical Skills		
Average	45	50.0
High	45	50.0
Have (availability) clinical skills laboratory for		

undergraduate training in medical school		
Yes	63	70.0
No	16	17.8
Not sure	11	12.2
Undergo any formal training in clinical skills laboratory during undergraduate training or Houseman-ship		
Yes	60	66.7
No	18	20.0
Not sure	12	13.3

Table 3 shows the distribution of respondents who had average and high scores for technical and non-technical skills. 85(94.4%) of respondents had high score for non-technical skills, while 45(50%) scored high for technical skills. 73(70.0%) research participants asserted to availability of clinical skills laboratory in medical school, and 60(66.7%) underwent some formal training in clinical skills laboratory during undergraduate training or Houseman-ship. However, 18(20.0%) did not undergo such formal training.

Table 4. Perceived Experiences of House Officers on Clinical skills in practice (n = 90)

Variables	Number (n)	Percent (%)
Have any challenge(s) with carrying out or applying clinical skills at the start of practicing medicine		
Yes	50	55.6
No	33	36.7
Not sure	7	7.8
First experience of applying clinical skills knowledge on patient with difficulty		
Passing urethral catheter	12	13.3
Doing random blood sugar	12	13.3
Setting I.V line	20	22.2
Passing Nasogastric tube	15	16.7
Suturing episiotomy	11	12.2
Venipuncture for blood sample	9	10.0
Giving Intramuscular injections	1	1.1
Urinalysis	8	8.9
No response	2	2.2
Coping strategy of first experience of clerking a patient and making diagnosis		
Full of Struggling/difficulty	28	31.1
Exciting/Done well	60	66.7
Can't remember	2	2.2
Practicing on a mannequin would make first experience in medical practice better		
Yes	60	66.7
No response	30	33.3
If achievable for undergraduate medical students to regularly use clinical skills before graduation		
Yes	90	100.0
If clinical skills or simulator laboratory should be available for use in clinical training		
Yes	90	100.0

The experiences of House Officers (new medical doctors) on their application of clinical skills in practice is indicated in Table 4. 50(55.6%) respondents had some challenges with carrying out or applying clinical skills when they started practicing medicine while 33(36.7%) did not. The first experience of applying clinical skills knowledge on patients varied among the respondents. While the first experience at clinical practice on patients was exciting for 60 (66.7%) respondents, it was full of struggles / difficulty for 28(31.1%) respondents. 60(66.7%) respondents would have loved to practice on a mannequin before their first on-patient experience. The respondents were unanimous in asserting that use of clinical skills or simulator laboratory for undergraduate medical students is achievable and should be made available for use in clinical training.

Table 5. Relationship between knowledge score on clinical skills and medical school of training attended (Foreign-trained and Nigerian-trained)

	Knowledge Score on Non-Technical Clinical Skills					
Medical School of training	Low Skills	Average skills	High Skills	Total	(X^2)	P-Value
Foreign Trained	0(0.0%)	2 (4.7%)	41 (95.3%)	43	0.128	0.543
Nigerian Trained	0(0.0%)	3 (6.4%)	44(93.6%)	44		

Total	0	5	85	90		

Knowledge Score on Technical Clinical Skills						
Medical School of training	Low Skills	Average skills	High Skills	Total	(X^2)	P-Value
Foreign Trained	0(0.0%)	18 (41.9%)	25 (58.1%)	43	2.182	0.103
Nigerian Trained	0(0.0%)	27 (57.4%)	20 (42.6%)	47		
Total	0	5	85	90		

The relationship between knowledge score on technical and non-technical clinical skills during undergraduate training and medical school of training attended presented in Table 5. There was no significant difference in the relationship between the medical school attended and knowledge of non-technical clinical skills possessed by the respondents. Although, the proportion of foreign-trained respondents that have elevated knowledge appeared to be slightly higher than the Nigerian-trained, the relationship was not statistically significant (P>0.05).

Discussion

The mean age of the respondents (newly qualified medical doctors) was 27.94 ± 3.05 years. This is similar to the mean age of 28 years among Australian junior doctors.[21] Half of the respondents had been in this phase of training (internship) for at least six months and hence had reasonable experience of both undergraduate training and internship. The proportion of foreign-trained and Nigerian trained medical doctors undergoing the internship training was almost equal. This implies that a significant number of Nigerians undertake their medical training outside the country. This finding could be directly related to quest for a state-of-the-art training in developed climes, the public's perception of the Nigerian educational system viz-a-viz the incessant industrial actions that prolong the training, and the ability of the parents/sponsors to fund the cost of foreign training. Nigerian students who completed their undergraduate medical training outside Nigeria are expected to pass the qualifying examination administered by the Medical and Dental Council of Nigeria to obtain a temporary licence to practice, and then participate in the internship training before they can be fully licenced to practice in Nigeria.

The mean knowledge score of non-technical clinical skills of 30.28±2.27 out of a maximum of 35, is significantly positive. Majority of respondents opined to having "exceptionally outstanding skills" in communication, obtaining informed consent, and awareness of personal limitation skills respectively. However, the mean knowledge score of technical clinical skills was 65.29±3.56 out of a maximum of 90. Low score (low skill) was recorded for taking a throat swab, collecting femoral blood sample, performing an electrocardiograph, and performing peak expiratory flow rate. This implies that there was some deficiency in both clinical and non-clinical skills among our newly qualified medical doctors following their self-opined evaluation. Higher scores were recorded for non-technical skills than for the technical skills. The reason for this observation could be that it is relatively easier to acquire the non-technical skills. However, it is the view of the authors that the scores are over-rated as they are self-assessment scores; an independent assessment may likely show lower scores.

Majority of the respondents had clinical skills laboratories in their training institutions, and most of them had some formal training in those facilities, however, a few did not. The implication of this is that not all the undergraduate training institutions have clinical skills laboratory, and hence not all the qualified junior medical doctors were exposed to clinical skills laboratory as part of crucial educational resources. Low exposure level of final year medical students to basic practical skills was reported in Port Harcourt 10 years ago.[22] Similar deficiencies have been reported in other African settings[3]. In our study, we were unable to ascertain if this lack of skills laboratory was for all students who trained within Nigeria or not. A study investigated the experiences of interns in six domains in regional hospitals in South Africa and emphasized the need to standardize procedural skills training in core curriculum of medical training[3].

More than half of the respondents had some challenges applying the knowledge of "acquired clinical skills" on real-time patients at the commencement of the internship, with some respondents described it as "full of struggles/difficulty". This buttresses the observation that the self-assessments may be over-rated. There was no significant difference in the relationship between the medical school attended and knowledge of clinical skills possessed by the respondents, but the response that practicing on mannequins before real-life real-time medical practice would be helpful is very significant and should be investigated. All respondents opined that establishment of clinical skills or simulator laboratory in medical schools is achievable and should be available.

Similar advocacy for functional clinical/simulation skills laboratory has been reported in Nigeria[3], Nepal[3], Africa,[3,4] India[3].

Availability and utilisation of clinical skills laboratories as training resources in modern education, is a requirement that accrediting bodies and the medical education regulatory authorities, should give serious consideration while accrediting medical institutions for undergraduate medical training. The establishment of such vital skills training no doubt requires incorporation in any curriculum review and should be reflected as part of the benchmark for minimum academic standards in medical training. The findings of this study therefore call for emphasis on practical skills exposure in the training of the undergraduates and house officers.

Implications of the findings: from the findings of this study, it is recommended that regulatory/accrediting agencies should encourage and probably enforce the establishment of clinical skills/simulator laboratory in training institutions where this is not available. Also, the frequent use of these facilities should be emphasized where they are available. The place of quality assurance mechanisms to ensure compliance in their use for training cannot be overemphasized.

Limitations: The outcome variables in this study are results of self-evaluation carried out by house-officers (medical interns) through questionnaire-based study. This may constitute some bias therefore, as the figures may not be as exact as it would have been if it was done by an independent evaluator.

Ethical Considerations: The approval of the Research Ethics Committee of the Rivers State University Teaching Hospital was obtained.

Conclusion

Majority of the respondents had above average scores for both technical and non-technical clinical skills. Some deficiencies were observed in some technical clinical skills where the scores were comparatively lower. Some interns had never been exposed to clinical skills laboratory, implying that it may not have been available in their training institutions.

Authors' contribution

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Conflict of Interest

There was no conflict of interest

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The cost of the study was borne by the researchers.

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