Opportunities for medical students to perform four common ward procedures in a Malaysian teaching hospital

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Introduction: Undergraduate medical education should be broad-based, holistic, integrated and should promote a framework for the development of higher order cognitive skills like communication, professionalism and teamwork to prepare the student for a life-long challenging medical career. Recent calls for a competency-based medical education require, in addition, competency in clinical and procedural skills prior to graduation. This study investigates how often opportunities exist for medical students to perform four common ward procedures prior to graduation.

Method: A prospective cross-sectional study to assess the opportunities a medical student have in performing four common ward procedures, comprising intravenous cannulation, nasogastric tube insertion, urinary catheterisation and chest tube insertion, in a State General hospital in Malaysia was done.

Results: A medical student has sufficient opportunity to perform only intravenous cannulation prior to graduation. He has a remote chance to insert a urinary catheter and is unlikely to have the opportunity to insert a nasogastric tube or insert a chest tube prior to graduation.

Conclusion: Although competency in clinical skills and procedural skills prior to graduation are desirable, this is increasingly difficult to achieve due to shortage of clinical material, teachers to supervise, the large numbers of medical students and house officers, the short time spent on the main disciplines and the failure of many universities to invest heavily in skills laboratories staffed by full time clinicians. The calls to introduce competency-based medical education in undergraduate medical education, particularly in procedural competence, should take into account the challenges in delivery and the realities in the hospitals today. This is necessary to avoid demoralising students who are unable to achieve their quota of procedures through no fault of theirs.

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Introduction

The Alder Hey organs and Bristol heart scandals in the late 1980s and early 1990s drew immense publicity to the medical profession and the image of the doctor being professional and clinically skillful was severely tarnished. The trust the community had for doctors for centuries was eroded and this led to reformation of clinical governance in United Kingdom hospitals.[1] Regulatory bodies are concerned that doctors must display professionalism and possess comprehensive knowledge and skills. This led to calls for a competency-based medical education (CBME) in recent years to replace knowledge-based medical education in the postgraduate curriculum.[2,3] Whether this competency-based model can be extended to undergraduate medical education is less clearly defined[4] because undergraduate medical education has significant differences from postgraduate education. Among the complex challenges are the large number of undergraduate students, insufficient clinical teachers to provide adequate supervision, the short periods spent in each clinical discipline resulting in limited exposure opportunities and inadequate investment to build skills laboratories for training. Nevertheless, calls to introduce some form of CBME in undergraduate medical education, particularly in procedural competence, have not abated.[5]

Of late, the proliferation of medical schools in Malaysia has resulted in increased numbers of house officers who now compete with medical students to perform common procedures in a hospital. The impact of this development on medical student training has not been studied before. This study was done to determine the number of opportunities a medical student has in performing four common clinical procedures in the 10 weeks they spend in the surgical and medical postings in Hospital Tuanku Ja'afar (HTJ), Seremban. As mastery of procedural skills is related to the volume of procedures

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performed[5,7,8,9], this study will give an indication on whether medical students can acquire competence in four common ward procedural skills before graduation.

Methods

A cross-sectional study was conducted in HTJ, which is the state referral hospital for Negeri Sembilan, Malaysia. The hospital is also the main teaching hospital for the International Medical University (IMU) and it has 850 beds with a bed occupancy rate of 70% per day in 2011. It has three surgical wards and five medical wards, each of which can accommodate a maximum of 50 patients. During the study period, there were 302 house officers in the hospital. Of these, 48 house officers were in the medical department and 56 in the surgical department. During this period, 42 medical students (28 in semester 6 and 14 in Semester 9) were posted to the surgical wards and 42 in the medical wards.

The study was done over a period of 10 weeks from November 2011 to January 2012. Ten weeks was chosen because this was the total time students spent in the Surgery and Medical wards in Semesters 6 and 9. The study period was not selected for any particular reason but coincided with the Semester 6 students' research period. Data was collected prospectively every day for 10 weeks on the 4 most common clinical procedures performed in the ward. They were intravenous (IV) cannulation, urinary catheterisation, nasogastric tube insertion and chest tube insertion. Every new insertion was counted as a new entry. The data collected was entered into the medical department or surgical department statistics depending on the ward it was obtained. Chi-Square test (1 df) was done to assess the difference in procedural volume between these two departments (http://www.graphpad.com/quickcalcs/chisquared1.cfm). Confidence level was set at $p < 0.05$.

Hypothetical calculations were then made on 2 scenarios. The first scenario (Scenario A) was that the housemen will take every opportunity to do all the procedures themselves and not give much opportunity to the students. The second scenario (Scenario B) assumes the best case scenario in that the housemen are generous enough to share all the procedures evenly with the medical students.

Results

A total of 5351 procedures was documented over the period of 10 weeks (Table 1). Approximately two thirds (64.5%) were performed in the 5 medical wards and one third (35.5%) in the 3 surgical wards. However, when the mean procedural volume per ward was calculated, the difference in volume between a medical and surgical ward was less pronounced (Medical – 690, Surgical 634) {Table 2}. The most common procedure was intravenous cannulation, which accounted for 78.7% of the total procedural volume. There were more opportunities to do this in a medical ward than a surgical ward but this did not reached statistical significance (p=0.06) {Table 2}. The opportunities to perform urinary catheterisation were similar in medical and surgical wards. Nasogastric tube insertion was also done more frequently in a medical ward and this was statistically significant (p=0.04). Chest tube insertion (95 cases, 1.8%) was the least common procedure. Opportunities to observe insertion of a chest tube is more likely in a surgical posting as the numbers performed in a surgical ward is 6 times that in a medical ward. This difference was statistically significant (p=0.0001). Chest tube insertion in the surgical ward was usually done for chest trauma.

In the best case scenario (Scenario B) which assumes that all the housemen are generous enough to share performance of the procedures with the students evenly, a student posted to medicine would have 30 opportunities to perform iv cannulation but only 15 opportunities in the surgical posting {Tables 3 and 4}. Again, in the best case scenario (Scenario B) there are 5 opportunities to perform urinary catheterisation during the medical posting and 3 during the surgery posting. Opportunities to perform nasogastric tube insertion and chest tube insertion hardly exist even in the best case scenario in both medical and surgery postings.

Discussion

Competency-based medical education (CBME) entails at least 4 themes. They are a focus on curricular outcomes, an emphasis on abilities, a de-emphasis on time-based learning and promotion of learner-centredness.[3] The emphasis on abilities is focused on observable competencies which can be assessed in a reliable and valid manner.[3] The objective of CBME is to ensure that medical graduates have the knowledge, skills and attitude to function as a doctor and are able to perform common procedures before graduation. Every year, about 5% of house officers in Malaysia have their training extended from 6 months to a year due to incompetence or lack of commitment to their job.[6] CBME would therefore seem a good solution to this problem. Our study suggest that issues on delivery and assessment of CBME remain formidable challenges.

During the study period there were 56 house officers and 42 medical students (28 in semester 6 and 14 in Semester 9) posted to the 3 surgical wards. The medical department had 48 house officers and 42 students in their 5 Medical wards. Given the larger volume of procedures and fewer house officers, medical wards offered more opportunities to do procedures than surgical wards with the exception of chest tube insertion. There were equal opportunities to perform urinary catheterisation in both the medical and surgical wards. However, the results showed that only intravenous cannulation had sufficient volume for both house officers and medical students to perform. In the best case scenario (Scenario B) which assumes that all the housemen are generous enough to share the procedures with the students evenly, a student posted to medicine would have 30 opportunities to perform iv cannulation but only 15 opportunities in the surgical posting. In view of the low volume of urinary catheterization, nasogastric tube insertion and chest tube insertion, medical students are unlikely to be given any opportunity to perform these procedures. At best, medical students will have the opportunity to observe these procedures. In practice, the best case scenario (Scenario B) does not exist because the hierarchical system of the hospital setting, and the presence of more house officers than students in the ward reduces whatever opportunities the medical student may have to perform the low volume procedures.

Competency in procedural skills is directly correlated with the frequency of procedure performance.[5-9] Clearly, clinical cases are insufficient for medical students to attain procedural competence before graduation due to the exponential growth in house officer numbers in Malaysia. An alternative measure to mitigate this lack of opportunity to perform on real patients is to invest heavily on simulation and manikins in the setting of a skills laboratory. Although there are criticisms to this approach and doubts on whether skills acquired this way are transferable, there is evidence that practice in a skills laboratory can enhance acquisition of procedural competencies. Medical students can be taught the procedural skill and encouraged to find time to practice on their own in the skills laboratory. One study showed that medical students could confidently perform thoracocentesis after four sessions of practice.[9] Video taping of the practice session and analysis of the activity is another method which can enhance learning.[10] Performance feedback sessions to identify areas of weakness and the giving of constructive criticism can boost the students' confidence, morale and improve their skills.[10,11] This approach will require employing dedicated clinicians committed to full time teaching in a skills laboratory.

Competency related deficiencies can be remediated in most instances but deficiencies in professionalism and self-awareness are the most difficult to impart and remediate.[12] This cannot be learnt from a skills laboratory and the time tested learning method of modeling after senior clinicians remain the most effective way of learning proper behavior and communication skills with patients.

A major change to embrace CBME must be planned carefully to take into account the resources and learning opportunities available. This study provides data on

the opportunities for performing common procedures in the ward. This information will avoid unrealistic expectations being made on medical undergraduates to perform a specified minimum number of procedures before graduation. Unrealistic expectations on the student can result in demoralisation and far reaching adverse consequences, like failure of progression or not being allowed to graduate. Major investment to upgrade skills laboratories, generous development and operational budgets to recruit clinicians to be full time instructors in the skill laboratories are required if we are serious about procedural skills competence in CBME.

We recognise some limitations in this study. The study sample was confined to the medical and surgical wards of a single hospital. This may not be representative of other university hospitals in the country. A large multicenter study may present a better picture of the situation in Malaysia. Seasonal fluctuation of the data collected is possible but its impact is probably insignificant.

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Table 1: Total Procedural volume from 5 Medical Wards and 3 Surgical Wards in 10 weeks

Procedure	Volume of common medical procedures		Total
	5 Medical Wards	3 Surgical Wards	
IV Cannulation	2743	1468	4211
Urinary Catheterization	466	278	744
Nasogastric Tube Insertion	221	80	301
Chest Tube Insertion	21	74	95
	3451	1900	5351

Table 2: Mean Procedural Volume of a Medical and a Surgical Ward in 10 weeks

Procedure	Mean procedural volume per ward in 10 weeks		P value
	Medical Ward	Surgical Ward	
IV Cannulation	549	489	0.06
Urinary Catheterization	93	93	1.00
Nasogastric Tube Insertion	44	27	0.04
Chest Tube Insertion	4	25	0.0001
	690	634	

Table 3: Opportunities to perform 4 common ward procedures in the Medical ward

Procedure	Volume of procedures	Scenario A Vol. per houseman	Scenario B Vol. per houseman & student
IV Cannulation	2743	57	30
Urinary catheterization	466	10	5
N/G tube insertion	221	5	2
Chest tube insertion	21	0.4	0.2
	3451		

Scenario A: 48 housemen performed all the procedures
Scenario B: 48 housemen and 42 medical students shared performance of procedures evenly.

Table 4: Opportunities to perform 4 common ward procedures in the Surgical ward

Procedure	Volume of procedures	Scenario A Vol. per houseman	Scenario B Vol. per houseman & student
IV Cannulation	1468	26	15
Urinary catheterization	278	5	3
N/G tube insertion	80	1	0.8
Chest tube insertion	74	1	0.8
	1900		

Scenario A: 56 housemen performed all the procedures
Scenario B: 56 housemen and 42 medical students shared performance of procedures evenly.