Clinical Skills in Final-year Medical Students: The Relationship between Self-reported Confidence and Direct Observation by Faculty or Residents

Walter Chen,[1,3]*MD, MS*, Shih-chieh Liao,[1]*PhD*, Chon-haw Tsai,[1,2]*MD, PhD*, Chiu-ching Huang,[1,2]*MD*, Cheng-chieh Lin,[1,2]*MD, PhD*, Chang-hai Tsai,[1,2,3]*MD, PhD*

Abstract

Introduction: Many students, while performing clinical skills such as medical interviewing/communication, physical examination, and procedural tasks, have never been observed by faculty members or residents. This study aimed to explore the relationships between final-year medical students' self-reported confidence and the frequency of direct observation by faculty member or resident while conducting these clinical skills. Materials and Methods: Medical students at China Medical University in Taiwan participated in the survey. Before graduating, they were asked to answer a questionnaire about (1) their confidence in performing 17 clinical skills including medical interviewing/communication, physical examination, and procedural tasks, and (2) the number of times they had been directly observed by faculty members or residents during student-patient encounters. Results: Many students reported never having been observed by a faculty member while they performed history taking/communication (46% to 84%), physical examination (36% to 42%), or procedural tasks (41% to 81%). It was found that residents had observed the students more frequently than the faculty members. The correlations between self-reported confidence and the corresponded direct observation were small to medium but significant. However, no difference was found between observation by a faculty member and by a resident. Conclusions: This study confirmed that many medical students have not been directly observed in clinical training; and that those who were observed more often, expressed more self-reported confidence. Some assessment measures, which focus on direct observation and feedback during student-patient encounters, may improve the students' confidence.

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Introduction

In clinical medical education, instructors train students in their medical knowledge and clinical skills. Medical educators also aspire to develop students' self-confidence in medical practice. The clinical skills of performing medical interviewing/communication, physical examination, and procedural tasks are the most important diagnostic and therapeutic tools. In a recent review, Holmboe[1] found that despite the continuing emphasis on the importance of clinical skills, these skills do not appear to be improving and may actually be declining. Another study found that students in half of US medical schools are not attaining the Medical School Objectives Project (MSOP) minimum ability to perform routine procedural skills.[2] In fact, both reports suggested that the training and evaluation of clinical skills should be re-emphasised. Holmboe commented that "without accurate evaluation of clinical skills, which can only be accomplished by direct observation, improvement in the clinical skills of physician trainees is unlikely."[1] Nonetheless, studies have shown that faculty members or residents often do not observe students when they are performing clinical skills. A recent survey by the Association of American Medical College (AAMC)[3] found that 27% of students indicated that they had never been observed by a faculty member while taking a complete history or performing a complete physical examination. Another survey of third-year medical students by Howley and Wilson[4] reported even lower rates of direct observation. Specifically, they found that students had never been observed by faculty members while taking a history (51%), and performing a focused physical examination (54%) or a complete physical examination (81%). This survey also found that students were observed more often by a resident than by a faculty member. However, none of the studies

[1] School of Medicine, China Medical University, Taichung, Taiwan, ROC
[2] China Medical University Hospital, Taichung, Taiwan, ROC
[3] China Medical University Beigang Hospital, Yunling, Taiwan, ROC
Address for Correspondence: Dr Walter Chen, School of Medicine, China Medical University, 91 Hsueh-shih Road, Taichung, Taiwan 40402, ROC.
Email: chenwalt@yahoo.com

answered the question of whether direct observation improves medical students' confidence in performing clinical skills.

This study aimed to explore the relationships between students' self-reported confidence in clinical skills and the frequency of direct observations made by faculty members or residents during student-patient encounters. The 3 research questions were: (1) Are medical students confident in some essential clinical skills? (2) How often are students observed by faculty or resident while performing these skills? (3) Do students who have been directly observed by faculty and resident feel more confident in their clinical skills?

Materials and Methods

A total of 124 final-year medical students attending China Medical University in Taiwan participated in the study. They received their final-year internship training in 3 teaching hospitals: China Medical University Hospital, Taipei Veteran General Hospital, and National Taiwan University Hospital. These students completed their internship training at the end of May 2005. The questionnaires, therefore, were mailed to all 124 students in the first week of May 2005. Non-respondents to the first mailing were sent a second questionnaire via email in the second week of May, and non-respondents to this prompt were telephoned in the third week of May to ask for their participation. Students were assured that their data would be reported only in aggregate and that no individually identifiable information would be reported.

The questionnaire contained 17 items that comprised 3 particular domains of clinical skills: (1) medical interviewing and communication skills (5 items, including "taking a history", "dealing with distraught patient" or "dealing with dying patient"), (2) physical examination skills (4 items, including "conducting a complete physical examination", "focused abdominal examination", " focused neurological examination" and "digital rectal examination), and (3) procedural skills (8 items, including "conducting a venipuncture," "inserting a Foley catheter" or "inserting a nasogastric tube"). The items of communication skills were selected from a questionnaire by Hill et al[5] and focused on interpersonal skills in difficult situations. Digital rectal examination was added to the list of general physical examinations due to the importance of this skill for students.[6] The items of procedural skills were compiled from the MSOP report,[7] which listed the minimum routine technical skills a student is expected to be competent at performing before graduating from medical school.

For each of the 17 skills, we used 3 questions to collect data on: (1) self-reported confidence, which was measured by 4-point scale with "not yet confident to do unsupervised"; "fairly confident to do without supervision"; "confident to do without supervision"; and "confident to teach the skill (representing the highest level of confidence)"; (2) the number of times they had been observed by a faculty member; and (3) the number of times they had been observed by a resident while performing the skill during the previous year. The students were asked to estimate, for each of the 17 clinical skills, the frequency which they had been observed and to refer to 5 possible separate observation levels: "never", "1-2", "3-4", "5-6", and "7+". The China Medical University Hospital's institutional review board exempted this survey study.

Given that the aim of the study was to evaluate the relationship between direct observation and confidence, the responses of students from 3 teaching hospitals were combined for data analysis. This study used 3 statistical tests, namely reliability test, Spearman's rank correlation test and z-test as well as the descriptive methods. The analyses for reliability test and Spearman's rank correlation test were conducted on 13.0 edition SPSS statistical software, and 8.1 edition MedCalc statistical software was used for the z-test. A two-tailed alpha level of 0.05 was adopted for all analyses.

Results

Ninety-one students (74%) returned the questionnaires, 88 (98%) of which were valid. The distribution of valid questionnaires in the 3 teaching hospitals was: China Medical University Hospital (36/54 students), Taipei Veteran General Hospital (30/40), and National Taiwan University Hospital (22/30). Respondents comprised 68 men and 20 women, with a median age of 25 years. Based on these 88 valid questionnaires, the Cronbach's alpha coefficient of the clinical skill confidence scale was 0.924, indicating satisfactory reliability.

The students' self-reported confidence levels in 17 clinical skills are listed in Table 1. It was only in the case of 4 out of 17 skills where more than 60% of the students reported being "confident in doing without supervision" or "confident in teaching the skill". More than 20% of the students reported being "not yet confident" in 7 out of the 17 skills. The 7 skills that students were not yet confident in were: dealing with difficult patients, telling a patient that he/she had a terminal illness, dealing with a dying patient, conducting a lumbar puncture or a thoracentesis, and, surprisingly, inserting an intravenous catheter and conducting a venipuncture.

In general, students reported that they were observed more often by residents than by faculty members. Table 2 shows that the majority of students reported that faculty members had never observed them performing medical interviews or communication (46% to 84% of students),

Table 1. Percentage (Number) Distribution of Self-reported Confidence in 17 Clinical Skills from 88 Final-year Medical Students

Clinical skills	Not yet confident	Fairly confident	Confident	Confident to teach
History taking	9.1% (8)	26.1% (23)	45.5% (40)	19.3% (17)
With distraught patient	15.9% (14)	45.5% (40)	28.4% (25)	10.2% (9)
With "difficult" patient	37.5% (33)	43.2% (38)	11.4% (10)	8.0% (7)
Announce terminal illness	52.3% (46)	28.4% (25)	12.5% (11)	6.8% (6)
With dying patient	52.3% (46)	33.0% (29)	6.8% (6)	6.8% (6)
Focused abdominal examination	5.7% (5)	50.0% (44)	26.1% (23)	17.0% (15)
Complete physical examination	10.2% (9)	53.4% (47)	21.6% (19)	14.8% (13)
Digital rectal examination	15.9% (14)	50.0% (44)	20.5% (18)	13.6% (12)
Focused neurological examination	19.3% (17)	54.5% (48)	15.9% (14)	10.2% (9)
Foley catheter	2.3% (2)	9.1% (8)	17.0% (15)	71.6% (63)
Nasogastric tube	4.5% (4)	10.2% (9)	20.5% (18)	64.8% (57)
Arterial puncture	9.1% (8)	22.7% (20)	25.0% (22)	43.2% (38)
Suture laceration	14.8% (13)	35.2% (31)	30.7% (27)	19.3% (17)
Intravenous catheter	35.2% (31)	26.1% (23)	10.2% (9)	27.3% (24)
Venipuncture	42.0% (37)	10.2% (9)	8.0% (7)	39.8% (35)
Lumbar puncture	68.2% (60)	22.7% (20)	2.3% (2)	6.8% (6)
Thoracentesis	73.9% (65)	15.9% (14)	3.4% (3)	6.8% (6)

physical examination (36% to 42% of students), and basic procedures (41% to 81% of students). The corresponding figures about never having been observed by residents were much lower: medical interviews or communication (15% to 74% of students), physical examination (22% to 28% of students), and basic procedures (21% to 77% of students).

Spearman's rank correlation coefficients between self-reported confidence and frequency of direct observations by faculty members or residents were computed for the 17 skills. The correlation analysis results presented in Table 3 illustrate that although the correlation coefficients were small to medium, all of the correlations between clinical skill confidence and frequency of direct observation were significant. For each of the 17 clinical skills, we used the z-test to compare the corresponding correlations with direct observations by faculty members or by residents. No significant difference was found in the levels of confidence between students who had been observed by faculty members and those observed by residents (Table 3).

Discussion

Apprenticeship is the cornerstone of clinical medical education. In addition to modelling their clinical behaviour after that of their clinical teacher's, direct observation by a teacher during student-patient encounters is important to the teaching and assessment of clinical skills. Traditionally, clinical skills are acquired during apprenticeship as a medical student through an informal "see one, do one, teach one" approach.[8] Although direct observation provides a valuable template for meaningful feedback to reinforce strong clinical skills and correct deficiencies, as others have reported,[2-4] this survey confirms that faculty members or residents did not frequently observe students while the latter were performing clinical skills. This deficiency in the medical students' learning is multifactorial, but is likely to be aggravated by lack of time, money and resources to motivate and support faculty members or residents, as well as the absence of reliable and valid tools.[9-12]

Early in 1995, a literature review concluded that medical students are deficient in skills related to interviewing, physical examination, and management of psychosocial issues.[13] These shortcomings in the teaching and learning of clinical skills were summarised and discussed by Kassebaum and Eaglen.[14] The findings of this article showed that too many medical schools still fail to employ evaluation methods that specifically assess students' skills and behaviours they need to learn to practice medicine. Our survey showed that 60% of graduating students reported being confident in only 4 out of 17 skills, i.e, taking a history, inserting a Foley catheter or a nasogastric tube, or conducting an arterial puncture. It is understandable that medical students are not yet confident in the more difficult tasks such as dealing with difficult patients, telling a patient that s/he has a terminal illness, dealing with a dying patient, conducting a lumbar puncture or thoracentesis, but we

Table 2. Percentage (Number) Distribution of the Frequency of Direct Observation by Faculty Member or Resident

Clinical skills	Observed by	Number of times student was observed				
		Never	1-2	3-4	5-6	7+
History taking	Faculty	45.5% (40)	22.7% (20)	15.9% (14)	3.4% (3)	12.5% (11)
	Resident	14.8% (13)	33.0% (29)	17.0% (15)	12.5% (11)	21.6% (19)
With distraught patient	Faculty	70.5% (62)	15.9% (14)	2.3% (2)	4.5% (4)	5.7% (5)
	Resident	54.5% (48)	20.5% (18)	8.0% (7)	3.4% (3)	12.5% (11)
With “difficult” patients	Faculty	65.9% (58)	19.3% (17)	9.1% (8)	1.1% (1)	4.5% (4)
	Resident	47.7% (42)	23.9% (21)	13.6% (12)	4.5% (4)	10.2% (9)
Announce terminal illness	Faculty	84.1% (74)	10.2% (9)	1.1% (1)	1.1% (1)	3.4% (3)
	Resident	73.9% (65)	17.0% (15)	4.5% (4)	1.1% (1)	3.4% (3)
With dying patient	Faculty	64.8% (57)	21.6% (19)	6.8% (6)	0.0% (0)	5.7% (5)
	Resident	53.4% (47)	21.6% (19)	8.0% (7)	4.5% (4)	11.4% (10)
Focused abdominal examination	Faculty	39.8% (35)	29.5% (26)	17.0% (15)	3.4% (3)	9.1% (8)
	Resident	28.4% (25)	33.0% (29)	10.2% (9)	11.4% (10)	15.9% (14)
Complete physical examination	Faculty	36.4% (32)	31.8% (28)	17.0% (15)	5.7% (5)	8.0% (7)
	Resident	21.6% (19)	28.4% (25)	14.8% (13)	10.2% (9)	22.7% (20)
Digital rectal examination	Faculty	39.8% (35)	35.2% (31)	10.2% (9)	10.2% (9)	4.5% (4)
	Resident	25.0% (22)	36.4% (32)	18.2% (16)	8.0% (7)	11.4% (10)
Focused neurological examination	Faculty	42.0% (37)	33.0% (29)	11.4% (10)	6.8% (6)	5.7% (5)
	Resident	25.0% (22)	26.1% (23)	18.2% (16)	17.0% (15)	13.6% (12)
Foley catheter	Faculty	59.1% (52)	21.6% (19)	6.8% (6)	2.3% (2)	10.2% (9)
	Resident	31.8% (28)	27.3% (24)	13.6% (12)	5.7% (5)	21.6% (19)
Nasogastric tube	Faculty	50.0% (44)	22.7% (20)	12.5% (11)	4.5% (4)	10.2% (9)
	Resident	33.0% (29)	23.9% (21)	19.3% (17)	5.7% (5)	17.0% (15)
Arterial puncture	Faculty	69.3% (61)	11.4% (10)	9.1% (8)	1.1% (1)	9.1% (8)
	Resident	38.6% (34)	30.7% (27)	11.4% (10)	3.4% (3)	15.9% (14)
Suture laceration	Faculty	40.9% (36)	25.0% (22)	22.7% (20)	3.4% (3)	8.0% (7)
	Resident	20.5% (18)	27.3% (24)	20.5% (18)	13.6% (12)	18.2% (16)
Intravenous catheter	Faculty	70.5% (62)	19.3% (17)	1.1% (1)	2.3% (2)	5.7% (5)
	Resident	44.3% (39)	21.6% (19)	15.9% (14)	5.7% (5)	11.4% (10)
Venipuncture	Faculty	75.0% (66)	14.8% (13)	2.3% (2)	1.1% (1)	6.8% (6)
	Resident	56.8% (50)	22.7% (20)	9.1% (8)	2.3% (2)	9.1% (8)
Lumbar puncture	Faculty	80.7% (71)	12.5% (11)	2.3% (2)	1.1% (1)	3.4% (3)
	Resident	55.7% (49)	33.0% (29)	6.8% (6)	0.0% (0)	4.5% (4)
Thoracentesis	Faculty	80.7% (71)	12.5% (11)	5.7% (5)	1.1% (1)	0.0% (0)
	Resident	77.3% (68)	19.3% (17)	2.3% (2)	0.0% (0)	1.1% (1)

were surprised to note that significant numbers of students were not confident in 2 relatively simple skills: inserting an intravenous catheter and venipuncture.[2] After an in-depth look at the data, we found that most of the students who were not confident in these 2 skills received their clinical education in 1 hospital, China Medical University Hospital. We later found, after interviewing the students and the staff members of the hospital, that China Medical University Hospital has set up an “intravenous team” for regular patient care in order to reduce the workload of students. The students were no longer required to conduct venipuncture or administer intravenous drugs. It is highly likely that the students in this hospital are not confident in inserting an intravenous catheter and venipuncture because they do not have the chance to practise these 2 procedural skills. The hospital changed this policy and began offering remedial training immediately after we found this deficiency. We will follow the consequences of the changes.

Harrell et al[15] found a significant association between medical students’ confidence and experience in caring for

Table 3. Correlation of the Self-reported Confidence with the Frequency of Direct Observation by Faculty or Resident

Confidence level in clinical skills	Frequency of observation		Z-test *P* value
	By faculty	By resident	
History taking	0.218*	0.312**	0.509
With distraught patient	0.527**	0.443**	0.473
With "difficult" patients	0.319**	0.355**	0.791
Announce terminal illness	0.287**	0.516**	0.072
With dying patient	0.332**	0.349**	0.900
Focused abdominal examination	0.448**	0.366**	0.521
Complete physical examination	0.372**	0.372**	1.000
Digital rectal examination	0.377**	0.578**	0.086
Focused neurological examination	0.438**	0.344**	0.468
Foley catheter	0.216*	0.233*	0.907
Nasogastric tube	0.259*	0.357**	0.479
Arterial puncture	0.254*	0.312**	0.680
Suture laceration	0.607**	0.642**	0.708
Intravenous catheter	0.371**	0.546**	0.145
Venipuncture	0.392**	0.514**	0.315
Lumbar puncture	0.593**	0.425**	0.136
Thoracentesis	0.706**	0.656**	0.542

Spearman's correlation coefficient (r_s), significant at 0.05* and 0.01** level (2-tailed)

patients within a primary care clerkship. It was determined that hands-on clinical experience was more important than any other variable in building students' confidence. Similar findings which stated that there was a significant correlation between the number of times a skill was performed and the level confidence of the individual student were elucidated by Morgan and Cleave-Hogg.[16] It would seem logical that the amount of clinical experience and hands-on management is important in building students' confidence, but the quality of the learning experience also plays an important role. The students in our survey showed that their confidence in different clinical skills was significantly related to the number of direct observations. It is possible that students who obtained more observation may have been engaging in those skills more often, so the effect is more practice, not the act of observation. Nevertheless, if students were directly observed more frequently, they tended to have higher confidence. Our survey also showed that it makes no difference whether the direct observation is done by members of the faculty or by a resident. The important role residents play in clinical education cannot be overemphasised.

This study used self-reported confidence rather than actual demonstrated competence or performance. Several studies have questioned the relationship between self-reported confidence and formally assessed competence, and the differences between what students can do in controlled situations (competence) and what they really do in actual practice (performance).[16-18] The gaps between confidence, competence and performance have not been studied in our survey. Although self-reported confidence may not indicate actual competence or performance, students who reported not feeling confident are hardly ready to meet the needs of patients and society.

Although this study was conducted in a single institution, the answers of the students came from 3 medical centres in Taiwan, which allows the results to be generalised beyond the institution. Another limitation of this study is that the number of students was small and only final-year medical students were invited to participate. If students in the first clinical year (clerkship) had been recruited, more comprehensive and in-depth information could have been obtained. Finally, although the correlation coefficients between the observation and confidence were statistically significant, they indicated only a fair to moderate degree of relationship; and we did not examine the theories that explain how direct observations improve students' self-confidence. Further studies are needed to explore what factors influenced how often students were observed.

This survey confirmed the important issue of lack of

direct observation in the clinical training of medical students. It also showed that final-year medical students' self-reported confidence in clinical skills is influenced by the number of times they were directly observed. More assessment measures, which focus on direct observation and feedback, such as mini-Clinical Evaluation Exercise (mini-CEX),[10] Structured Clinical Observation (SCO)[9] or Brief Structured Clinical Observation (BSCO),[12] are needed during student-patient encounters.

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