



ASSESSMENT/EVALUATION

## Assessing Confidence and Competence of Senior Medical Students in an Obstetrics and Gynaecology Clerkship using an OSCE

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**ABSTRACT Context:** *Assessment of clinical confidence and competence of senior medical students during an obstetrics and gynaecology clerkship using an objective structured clinical examination (OSCE).*

**Method:** *A questionnaire was distributed to senior medical students (n=47) to assess pre- and post-OSCE self-perceived confidence and competence in five clinical skills: history taking, performing pelvic examination, interacting and communicating with patients, clinical reasoning and dealing with difficult patient situations. Pre- and post-performance confidence levels were compared and correlated with OSCE scores.*

**Results:** *The five clinical skills were significantly interrelated (p=0.001). There was no significant difference in OSCE performances between male (n=16) and female (n=31) students. Pre- and post-OSCE confidence in performing pelvic examination was significantly higher in female than male students (p=0.01). Post-OSCE confidence in clinical reasoning and dealing with difficult patient situations only were significantly increased in both groups (p=0.01 and p=0.02, respectively). Pre- and post-performance confidence levels were not significantly correlated to OSCE scores.*

**Conclusion:** *Of five clinical skills rated, self-confidence in clinical reasoning skills and dealing with challenging or complex patient problems only were significantly increased after an OSCE assessing competence. The content of some of our OSCE stations thus enhance confidence in these skills but psychometric and other characteristics of the OSCE such as duration and performance feedback mechanisms need further investigation.*

**KEYWORDS** *Clinical skills, competence, confidence, OSCE, obstetrics and gynaecology, evaluation.*

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## Introduction

An important objective of medical education is to improve clinical competence and hence confidence of medical students. Competence can be conceptualized in terms of knowledge, abilities, skills and attitudes displayed in the context of a set of realistic professional tasks (Hager & Gonczi, 1996) while “confidence” in oneself denotes the belief that one has the ability to do things well or deal with situations successfully.

Competence can be simply viewed as the mastery of both a body of relevant knowledge and a range of relevant skills including clinical, interpersonal and technical skills and is a prerequisite to performance in the real clinical world (Newble *et al.*, 1994). Self-confidence is desirable for medical students’ professional development, particularly if this confidence is supported by actual clinical skills (Yetterberg *et al.*, 1998). Lack of confidence may foster stress and thwart clinical performance, whereas misguided over-confidence in professional capabilities may have serious professional and malpractice consequences. However, teaching and assessment should have an impact on students’ sense of competence and confidence, and changes in both should be amenable to measurement (Yetterberg *et al.*, 1998). Despite significant developments in assessment methods that probe competence, medical educators must continue to identify aspects of teaching, learning and assessment that best enhance students’ development of clinical skills (Kassebaum & Eaglen, 1999) and confidence in skills (Yetterberg *et al.*, 1998).

The objective structured clinical examination (OSCE) is a well-established student assessment tool which is competency-based and is a valid, practical and effective means of assessing clinical skills that are fundamental to the practice of medicine and other health care related professions (Harden & Gleeson, 1979; Cohen *et al.*, 1990; McFaul & Howie, 1993; Gilson *et al.*, 1998; Prislin *et al.*, 1998). Previous studies have furthermore indicated that self-assessed clinical confidence of students correlates with performance on various interventions and assessment measures such as the OSCE (Yetterberg *et al.*, 1998). In the Faculty of Medicine and Health Sciences (FMHS) of the United Arab Emirates (UAE) University, we were interested in determining the extent to which these findings were applicable to our students particularly since there are conservative cultural barriers which place constraints on male students examining female patients and hence impinge on clinical skills development of male students in the obstetrics and gynaecology clerkship (Rizk & Elzubeir, 2000). Hence evidence for assumption of a positive relationship between levels of clinical confidence and quality of performance was sought since it would be expected that a performance-based test like the OSCE would enhance confidence in clinical skills in both male and female students. Our hypothesis was that students’ self-assessed confidence and competence in five clinical skills would be improved after going through the

OSCE and that self-assessed confidence in clinical skills would correlate with OSCE scores.

## Background

The obstetrics and gynaecology clerkship at the FMHS is taught as a 10 week rotation in the final year of the 6-year medical school curriculum. Senior students are divided into four equal groups for each clerkship since the academic year accommodates four successive rotations. The objective of the rotation is to provide a well-balanced programme of medical education in clinical obstetrics and gynaecology designed to facilitate the choice of and/or preparation for increasing professional responsibilities in the specialty.

Obstetrics and gynaecology departments are located in two hospitals affiliated with the medical school. The core teaching programme consists of clinical skills acquisition, clinical management discussions, literature search and data collection projects. The first half of the clerkship consists of intense sessions of clinical instruction that end with a formative assessment. The latter portion of the clerkship provides opportunities to fulfil requirements of the “Log Book” (a daily record of clinical activities) and is devoted to semi-independent self-directed activities and projects. Methods of instruction include clinical and ward teaching, tutorial sessions and case presentations as well as clinical and pathological conferences and seminars. Students acquire clinical skills and assume patient care responsibility under close supervision. Students, therefore, share in the resident on-call roster for obstetrics and gynaecology and are assigned similar clinical responsibilities in the hospital. There is a further internship period in obstetrics and gynaecology for two months after qualification without a full examination at the end of training.

## Methods

At the end of the senior obstetrics and gynaecology rotation at the FMHS, there is a full examination which normally includes an OSCE, a “clinical”, a *Viva voce* (oral) and written examinations. Each component contributes an equal proportion to the final mark (total of 60). To pass, students need to achieve at least 75% (45 correct). The OSCE consists of 12 stations that test a range of clinical skills such as interpretation and/or explanation of laboratory results, radiographs, surgical instruments, pathology specimens, medical appliances and simulated models. These stations were intended to assess synthesis and communication of clinical information, interpretation of results of clinical investigations, formulation of management plans, application of clinical algorithms and deductive reasoning in establishing clinical diagnoses. Students are allowed 5 minutes at each station. The clinical examination consists of

history taking, case presentation and physical examination of two patients in the hospital. The *Viva* entails further discussion of the cases seen at the clinical examination and usually focuses on the practical aspects of diagnosis and treatment. The written examination consists of multiple choice questions of the 1:4 variety, extended matching questions and patient management problem scenarios.

### *Participants*

The data described in this study are for the full 1999 and 2000 cohorts of final year students of the FMHS, UAE University ( $n=47$ ). The study sample comprised 31 female and 16 male students, which is reflective of the medical school population where approximately two thirds of the students are female.

### *Questionnaire*

Students were asked to complete a self-administered questionnaire designed to assess self-perceived confidence and competence in clinical skills, as previously described (Yetterberg *et al.*, 1998), both prior to and after the OSCE component of the end-of-clerkship assessment in obstetrics and gynaecology. The survey used a 10-point rating scale for the students to indicate their levels of confidence and competence in five clinical skills: history taking, performing pelvic examination, interacting and communicating with patients, clinical reasoning and dealing with difficult patient situations (Table 1). The interrelationship between the five clinical skills was evaluated to determine the reliability of our questionnaire.

### *Data Analysis*

Because of the small sample size, non-parametric tests were used for data analysis. Differences in students' responses pre- and post-performance were compared using the Wilcoxon matched pairs signed rank test. Our sample size had a 75% power to detect a probability of 0.8 that pre-examination observations differed from post-examination observations using this test with a two-sided significance level of 5%. Results of male and female students were compared using the Mann – Whitney U test. The relationships between OSCE and pre- and post-performance confidence levels as well as the interrelationships between the five clinical skills were determined by Spearman correlation. For all analyses, a  $p < 0.05$  was considered significant.

## **Results**

There were no missing data. Individual performance on the OSCE ranged from 75% to 97%. There was a significant difference in OSCE scores between male and female students ( $p=0.04$ ). Mean scores for males was 82.71% and 86.84% for females. The interrelationship between the five clinical skills of the

**Table 1.** Interrelationships among five assessed clinical skills ( $n=47$ )

	History taking	Performing pelvic examination	Interacting & communicating with patients	Dealing with difficult patient situations (e.g. breaking bad news)	Clinical reasoning
History taking	1.00				
Performing pelvic examination	0.241* [0.103]	1.00			
Interacting and communicating with patients	0.552 [0.001]	0.366 [0.012]	1.00		
Dealing with difficult patient situations	0.566 [0.001]	0.346 [0.017]	0.741 [0.001]	1.00	
Clinical reasoning	0.609 [0.001]	0.209 [0.159]	0.520 [0.001]	0.708 [0.001]	1.00

\*r [ $p$ -value].

questionnaire were highly significant (Table 1) and reliability analysis revealed a Cronbach's alpha of 0.80.

Confidence levels of students in their clinical skills pre- and post-OSCE are shown in Table 2. Highest levels of confidence both before and after this examination were in interacting and communicating with patients and in taking an obstetric and gynaecological history. The lowest level of confidence was in performing a pelvic examination. There was also a significant gender difference in pre- and post- OSCE self-assessed confidence in this clinical skill ( $p=0.01$ ). Male students were low to moderately confident whilst female students were moderately to highly confident. There was a significant increase in students' perceived levels of confidence in their clinical skills post-OSCE in only two areas: clinical reasoning ( $p=0.01$ ) and dealing with difficult patient situations ( $p=0.02$ ).

Outcome of the correlation analysis between self-reported confidence levels and pre- and post-OSCE performance is shown in Table 3. This revealed no significant relationship.

## Discussion

Although clinical skills represents only one area of learning which cannot be assessed in isolation from overall professional performance, confidence in clinical skills has been used as a subjective indicator of clinical competence (Harrell *et al.*, 1993). Abilities are central to the concept of competence, and

**Table 2.** Students' self-assessed confidence levels in clinical skills before and after the OSCE in obstetrics and gynaecology ( $n=47$ )\*

	Pre-OSCE	Post-OSCE	Difference
History taking	8.06 ± 1.89**	8.32 ± 1.56	NS
Performing pelvic examination	5.74 ± 2.66	5.54 ± 1.87	NS
Interacting and communicating with patients	7.83 ± 1.63	7.98 ± 1.61	NS
Clinical reasoning	7.00 ± 2.07	7.51 ± 1.95	$p=0.01$
Dealing with difficult patient situations (e.g. breaking bad news)	6.49 ± 2.26	7.02 ± 2.01	$p=0.02$

\*Confidence rated in a 10-point scale where 0=none, 1–2=low, 3–4=low/moderate, 5–6=moderate, 7–8=moderate/high and 9–10=high. \*\*Mean ± SD. NS=not significant.

**Table 3.** Correlation between students' self-assessed confidence levels and their OSCE performance ( $n=47$ )\*

	Pre-OSCE		Post-OSCE	
	$r$	$p$	$r$	$p$
History taking	0.07	0.63	-0.06	0.71
Performing pelvic examination	0.15	0.32	0.06	0.67
Interacting and communicating with patients	0.09	0.55	0.01	0.97
Clinical reasoning	0.01	0.95	0.01	0.93
Dealing with difficult patient situations (e.g. breaking bad news)	0.01	0.95	-0.09	0.56

\*All results were not significant.

hence subjective and objective assessments of competence can be inferred from a sample of performance (Hager & Gonzi, 1996). Medical educators should understand which components of the educational experiences of students increase confidence and competence in their clinical skills with the confidence in turn validated by improved performance of those skills (Yetterberg *et al.*, 1998). Our study aimed to achieve this objective by determining the extent to which self-assessed confidence and competence in clinical skills develops after an OSCE assessing standard clinical skills in an obstetrics and gynaecology clerkship.

Our results indicate that students' confidence levels in taking an obstetric and gynaecological history and interacting and communicating with patients was high. Lowest levels of confidence, however, were observed in performing pelvic examinations. This finding was expected since we have previously found that male students felt less confident than female students about performing pelvic examination in a pregnant woman (Rizk & Elzubeir, 2000). This finding is also consistent with those of other authors (Greenfield *et al.*, 2001) who found

male medical students were more anxious than their female counterparts about performing clinical tasks involving intimate contact with patients of the opposite sex.

Medical students work hard to acquire clinical skills, and since development of confidence is educationally desirable, all students should be given opportunities to achieve similar levels despite their gender. More use of our clinical skills laboratory by both groups of students should facilitate practice of pelvic examinations under supervision in a safe, non-threatening environment. Though a clinical skills resource can never replace clinical experience, practice in such an environment can provide direct feedback, personal evaluation, opportunities for reflection on strengths and weaknesses and ultimately reduce anxiety of students (DuBoulay & Medway, 1999).

As noted in our study, students' confidence levels in clinical reasoning and dealing with difficult patient situations increased significantly post-OSCE. Clinical reasoning or clinical problem-solving ability and the aptitude to deal with challenging or complex patient problems are vital components of clinical competence (van der Vleuten & Newble, 1995). Reasons why our OSCE should only significantly increase confidence in these skills are not entirely clear. Though further studies will be necessary to investigate uncertainties generated by this study one possible explanation concerns the particular content of our OSCE stations. These included a combination of stations designed to test students' abilities in history taking, physical examination, interpretation of data and results, practical procedures as well as factual knowledge related to clinical situations such as antenatal diagnosis of congenital foetal anomalies and screening for gynaecological cancer. In essence, all methods allow assessment of clinical reasoning, but the challenge in testing it is to ensure that application of knowledge in a concrete clinical situation preferably requiring the student to weigh probabilities or decide upon actions is evaluated (van der Vleuten & Newble, 1995). It would thus appear that the focused clinical scenarios presented in our OSCE enabled this evaluative process to enhance confidence in students' clinical reasoning and dealing with difficult patient situations.

Although other studies have shown a positive correlation between pre- and post-OSCE performance and students' self-perceived confidence and competence in clinical skills (Yetterberg *et al.*, 1998) we did not find such correlation. One possible reason for this finding involves the extent to which our students are able to accurately self-assess confidence. Self-assessment of knowledge and performance is essential to the practice of medicine (Antonelli, 1997), but some studies have cast doubt on the accuracy of students' self-assessment (Wolliscroft *et al.*, 1993) and have identified inconsistent gender-based differences, with women tending to underestimate their clinical performance more than men (Coutts & Rogers, 1999). Other studies, however, have shown that the average student is a reasonably competent assessor of his or her relative strengths and weaknesses (Regehr *et al.*, 1996) and that their self-assessment skills improve over time (Manogue *et*

*al.*, 1990). The relationship between self-confidence and self-assessment is also unclear and warrants further study (Coutts & Rogers, 1999). Although the process of self-assessment is complicated, context dependent and influenced by many self-beliefs, self-evaluation instruments may be best used to facilitate reflection on performance, personal limitations and weaknesses rather than to test the accuracy of self-evaluation (Stewart *et al.*, 2000). Methods to improve critical self-appraisal skills of our students may, nevertheless, be called for.

A second explanation involves the extent to which our OSCE on its own fosters confidence. Assessing students' levels of confidence pre- and post- other assessment components of our clerkship such as the clinical and *Viva* might have revealed significant associations with performance outcomes. However, based on our finding, it seems that the important teaching and feedback qualities of our OSCE are not being utilized. Since assessment of clinical skills without feedback is unlikely to increase confidence, clearly it is vital that the OSCE be used both as a summative and formative assessment instrument (Biran, 1991). Whilst some authors have reported similar technical limitations and challenges of the OSCE (Mavis *et al.*, 1996), others have demonstrated that it is possible to give valuable extra instruction and feedback in an individual and group administered OSCE (Biran, 1991). Furthermore, it is suggested that immediate feedback does not impair the validity and reliability of the assessment, provided that station content is sufficiently varied (Khan *et al.*, 1997).

Limitations of our study and possible explanations for our results are that our sample size was too small to detect a difference in the outcome measured and that our end-of-clerkship OSCE is too short to achieve acceptable reliability levels. Our sample size of 47, however, gave a 75% power to detect a probability of 0.8 that pre-examination observations differed from post-examination observations.

In order to achieve a valid and reliable assessment of competence, sampling from a larger number of clinical problems and across the full range of competence categories is also recommended (Newble *et al.*, 1994). Careful selection of stations based on their psychometric characteristics as well as combining the OSCE with other written and unwritten assessment tools would also appear essential to improve student learning and development (Newble & Swanson, 1988).

## Conclusion

The present study showed that self-perceived clinical confidence and competence of senior students during an obstetrics and gynaecology clerkship is not significantly increased after an OSCE except in clinical reasoning and dealing with difficult patient situations. A major achievement of this study has been a more critical analysis of our end-of-clerkship OSCE as well as the self-

assessment of clinical skills of our senior students. Our findings have indicated that the content of some of our OSCE stations enhances confidence in clinical reasoning ability and dealing with challenging patient problems but that psychometric and other characteristics such as duration and performance feedback mechanisms need further investigation. Now that a simple assessment tool is available to measure students' clinical confidence and competence in obstetric and gynaecological skills, it should be possible to collect similar data from other clinical clerkships. A need to develop and implement our self-assessment instrument to facilitate students' reflection on clinical performance, personal limitations and weaknesses and help medical educators gain insight into students' beliefs about their current clinical abilities is, however, indicated.

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