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Confidence and performance in objective structured clinical examination

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Confidence and competence in the Objective Structured Clinical Examination

Abstract:

A total of one hundred and three pre-registration midwifery students (42 year one; 61 year three) took part in Objective Structured Clinical Examinations (OSCEs) as part of their routine assessment over a three year pre-registration course. They completed pre- and post- exam questionnaires which asked them to rate their confidence in the clinical skills being assessed on a scale from 1 to 10 (1 being 'not confident' and 10 being 'totally confident'). Their perceived confidence was matched against a series of 52 statements relating to skills and competencies associated with their professional role.

A follow-up study was done with the former year 1 students (now year 3) who again completed a pre- and post- exam questionnaire. Here we explored the data to investigate the relationship between self-confidence and performance during an OSCE and to begin to understand the dynamics of the situation.

Pearson test was used to investigate the correlation between the OSCE scores and students' confidence and t-test was employed for comparative analyses.

The results showed significant increases in mean confidence levels from before to after OSCE for both first and second year students (5.52(1.25) to 6.49(1.19); $p=0.001$ & 7.49(0.87) to 8.01(0.73); $p<0.001$, respectively). However, there was no significant correlation between confidence levels before undertaking the OSCE and the final OSCE test scores ($r= 0.12$; $p=0.315$).

This lack of significant correlation may be due to the inherent complexity of assessing such relationships. Larger studies with mixed methodology are required for further investigation of this important area of education and assessment research.

Background:

Harden and Gleeson first introduced the OSCE into medical education in Scotland in 1975 as a way of eliminating the subjective and opportunistic nature of examining live patients in clinical settings (Harden, R. Gleeson, F. 1979). The idea was soon widely adopted in other healthcare education settings. While the format of nursing & midwifery OSCEs varies across universities, they all share the principle of seeking to objectively assess a student's proficiency in common advanced clinical practice skills such as history taking and physical examinations.

Measurement and evaluation of clinical skills is a necessary part of any teaching, learning and assessment strategy for students on medical, clinical or allied health professions training courses.

The need for this kind of assessment tool within nursing and midwifery was highlighted by the alleged shortcomings of Project 2000 (RCN, 1998) to ensure that practitioners had the necessary clinical skills to perform competently (Luker et al. 1997). The Peach Report (1999) confirmed that there was a palpable theory - practice gap. In 2002 the UKCC was replaced by the NMC and the 'fit for purpose' debate was expanded and fully engaged. A major part of this discussion focused on skills and competencies.

One important means of emphasising the need to develop competency in clinical skills was to adopt methods from other disciplines. Both Nicol and Freeth (1998) and Scott (2001) described an approach that was based on 'skills labs' where student healthcare professionals could practice in relative safety while recognizing a gap between the lab and the ward or clinical environment.

The OSCE is now well established in nursing and midwifery although some have questioned its value (Khattab and Rawlings, 2001). In this paper we present data from a recent longitudinal project and through the application of statistical tests will examine the relationship between the reported self confidence of students prior to undertaking the OSCE and their actual performance.

Literature

The adoption of the OSCE as an assessment tool cannot entirely dissolve the divide between an artificial learning environment and the reality of the practice setting,

however there is a considerable amount of evidence in support of its value in health care education.

One of the main claims in favour of the OSCE is that while it occurs in an artificial setting the actual experience is sufficiently close to 'real life' to induce a level of disquiet in students sufficient so that it mirrors practice. Those who 'pass' will feel that their skills have been genuinely tested. In addition the resulting increase in confidence will go on to inform future practice (Street and Hamilton, 2010).

Birch *et al* (2007) whose study involved teams coping with obstetric emergencies show that 'all team members reported an increase in confidence following the training they had received'. (2007:921). Likewise Brosnan *et al* (2005) working with pre-registration nursing students, were clear that students' confidence levels increased as a result of taking part in the OSCE(2005:121). They then cite Thiele *et al* (1991) who claim that it is the simulated environment that allows student confidence to grow. The relationship between confidence and competence was raised by Coutts(1999) and as yet this is still to be fully resolved. We will remark on the phenomenon in the discussion.

Rushforth (2007) in her review of the literature attributes the success of the OSCE to a widely held appreciation shared by students and examiners alike (Roberts and Brown, 1990) that the OSCE does what it says on the tin and produces valid results (it measures what it sets out to measure) and further that these results are also generalisable and reliable (Schuwirth and van der Vleuten, 2003; Bartfay *et al.*, 2004).

Of direct relevance to our study is the notion of confidence. Competence and confidence are closely linked (Elzubier, 2001; Morgan and Cleave-Hogg, 2002) and in clinical situations one will contribute to the other. Lauder *et al*(2008), substitute the term 'self-efficacy', (borrowed from the work of Bandura) and operationally defined as

'.....one's ability to organise and execute those actions required to manage situations (Bandura 1995). According to Lauder *et al* (2008) 'having the belief that one has the required skills to succeed, can be regarded as an indicator of an individual's way of thinking and behaving' (2008:36).

While Lauder *et al* (2008) studied nursing students, Elzubier (2001) used medical students in an obstetrics module and tested their confidence pre- and post OSCE . Birch *et al* (2007) also focused on obstetrics when they conducted a piece of research designed to discover the best method of training staff in the management of an obstetric emergency. Staff groups included doctors and midwives. They did this by dividing thirty six staff randomly into groups of six and each group was allocated either lecture based teaching only, simulation based teaching only or a combination of the two.

In the two studies closest to our own in design (Elzubier *et al* 2001; Lauder *et al*, 2008), we found an emphasis on the twinned concepts of confidence and competence. Elzubier *et al* (2001) define the concepts of confidence and competence. Competence can be conceptualized in terms of knowledge, abilities, skills and attitudes displayed in the context of a set of realistic professional tasks, while 'confidence' in oneself denotes the belief that one has the ability to do things well or deal with situations successfully' (2001:374). In their study they found no positive correlation between pre and post-OSCE performance and students' self-perceived confidence and competence in clinical skills. They attributed this to issues around the fidelity of self-assessment (2001:379).

However, just as the OSCE can be criticised for reducing the caring experience to a discrete series of tasks (Nicol and Freeth, 1998) with associated fidelity issues so can any analysis be weakened if it isolates 'confidence' as a stand-alone outcome. Students who undertake an OSCE can feel more or less confident *about* their knowledge, skills or abilities and it is the relationship between confidence and subsequent competence to practise that interests researchers.

Therefore, our aims in conducting the study were:

- to compare self-reported confidence levels for both year 1 and year 3 students pre-OSCE.
- to compare changes in reported confidence between years 1 and 3
- to look for any correlation between reported confidence levels pre- OSCE and competence as suggested by the scores for the OSCE

Setting

In the current setting, OSCE assessments have been used within the local curriculum for the last 5 years. Throughout that time a number of developments have been made and work to further develop the OSCE assessment to mirror current clinical practice continues. OSCEs are held as unseen exams, although students are informed early in the taught module of the purpose of the assessment and are clear that the assessment seeks to assess that clinical competence is underpinned by a strong theoretical base. They are aware therefore that they can be assessed on any clinical activity which falls in line with the taught module learning objectives. OSCE assessments are held within clinical skills laboratories and it is normal for several assessments to be taking place simultaneously. Whilst this can create a busy environment on occasion, it is recognised that this replicates the clinical setting in which there may be a number of activities going on in one area at any given time. The OSCE therefore seeks to mirror a real life clinical setting as far as is possible within the confines of an educational institution.

Within the year one OSCE, students are awarded marks for each clinical skill assessed with a maximum nine marks available for each station (the scores were reported as percentages). This is broken down into marks for Skills, Knowledge and the number of prompts needed to demonstrate the skill satisfactorily. Failure to achieve a mark in any of these areas constitutes a referral for the student as this is considered to demonstrate unsafe practice. Year three OSCEs are marked using a 100 point scale with a pass mark of 40%. Elements which are considered to be essential to safe, ethical practice are essential criteria and must be demonstrated in order to achieve an overall pass. The essential elements required include principles of infection control including hand washing and universal precautions, gaining client consent and adherence to the statutory regulations.

Study Design

This was a retrospective observational study investigating the relationship between self-reported confidence and performance in the OSCE. The study was approved locally by the Faculty Research Ethics Committee at Sheffield Hallam University. All students were invited to take part and a total of 103 pre-registrations 1st and 3rd year

midwifery students participated in this study. They were asked to complete a confidence questionnaire before and after completing the OSCE.

Confidence questionnaire

The confidence questionnaire is based on collaborative work between Walsh and Steele who adapted the 52 unit self-reported confidence questionnaire from original work by Fenton and Brykczynski (1993). This questionnaire was then adapted for use with midwifery students and is available to view in the appendix. Each item is designed to estimate the subject's confidence in their ability to undertake a particular midwifery task on a 10 point likert scale where 1 = not at all confident and 10 = completely confident. A total confidence score is calculated by summing the item scores and dividing by 52 to give a mean confidence score out of a maximum 10 points.

Confidence questionnaires were completed by midwifery students prior to undertaking the OSCE and then again immediately afterwards.

The OSCEs took place in March 2009. All students were expected to demonstrate competence in carrying out the skills whilst demonstrating underpinning theoretical knowledge, giving rationale for their care management decisions and linking their practice to the statutory regulation of midwifery.

The year three OSCE lasted three hours and comprised four 30 minute stations¹:

- vaginal breech birth
- neonatal resuscitation
- shoulder dystocia
- postpartum haemorrhage

The year one OSCE comprised eight 10 minute stations.

- Mechanisms of labour

¹ two rest stations

- Infant feeding (2 stations)
- Role of the midwife
- Antenatal blood screening
- Blood pressure measurement
- Urinalysis
- Medicines administration
- Describe and explain the role of the midwife including the statutory regulatory framework

In addition the responses to the 52 point questionnaire on competencies have been condensed into 4 categories to facilitate sub-analysis. This leaves us with the following four competence categories (the numbers in brackets refer to the items in the questionnaire provided in the appendix): -

- a Clinical, Knowledge and Skills : [1,2,11,13,14,15,16,17,18,20, 22, 36,39,40,44]
- b (Care) planning: [3,7,8,10,19,21,28,38,45]
- c Communication and psychosocial care: [4,6,12,,23,24,33]&[5,9,26,37]
- d Professional behaviour: [25,27,29,30,31,32,34,35,41,42,43,46,47,48,49,50,51,52]

A mean confidence score in each category is calculated by summing the item scores and dividing by the number of items in each category to give a mean confidence score out of a maximum 10 points.

Data analysis

Data was collated in excel and transferred to SPSS 17.0. The data were checked for normality using the Shapiro-Wilk Test and for linearity using scatterplots of the OSCE and confidence data to test for suitability for analysis using parametric statistics. Since assumptions of normality and linearity were met descriptive data is presented using means and standard deviations.

Within-group comparisons and between-group comparisons were tested using dependent t-tests and independent t-tests respectively. Pearson correlations were

used to investigate the relationship between OSCE scores and confidence scores. A two-tailed p value of less than 0.05 was considered statistically significant.

Results

A total of 103 pre-registrations 1st year (n= 42) and 3rd year (n=61) midwifery students participated in this study, however, complete data sets were obtained from a total of 32 1st years and 40 3rd years.

Mean OSCE scores, mean confidence levels by category and mean total confidence levels for 1st and 3rd year midwifery students prior to undertaking OSCE and after taking the OSCE is shown in Table 1. Independent t-tests reveal that third years report greater total confidence prior to taking the OSCE than 1st year students {Mean Pre OSCE confidence levels: 1st years 5.52(1.25); 3rd years 7.49(0.87); $t=-8.276$; $p<0.001$; $n= 80$ }.

table 1 here please

However paired t-testing reveals that both 1st years and 3rd years demonstrate a significant increase in confidence once they have completed the OSCE task. First year's confidence levels increased significantly from a mean 5.52(1.25) to 6.49(1.19) after OSCE testing { $t=-3.592$; $p=0.001$; $n=30$ } whilst confidence levels for 3rd years increased significantly from 7.49(0.87) to 8.01 (0.73) { $t=-5.817$; $p<0.001$; $n=42$ }.

Mean OSCE performance scores was better for 3rd years with a score 72.02(13.58) than for 1st years who scored 62.40 (13.42). However there was no significant correlation between confidence levels before undertaking the OSCE and the final OSCE test scores {Pearsons $r= 0.12$; $p=0.315$; $n=80$ }.

Discussion

It is useful for educators to know which aspects of the courses they teach have the maximal effect on the confidence and competence of students. This is particularly

true of professional based course where skills training is so important for educational and registration purposes as competence in performing clinical skills is mandated not only by the educational institution but also by the professional bodies who will oversee the register of practitioners. Measurements of confidence and competence are therefore good indicators, when measured longitudinally, of the extent to which students are progressing and the OSCE seems to offer an opportunity to make this assessment.

However, our findings suggest that separating the various strands of competence and confidence that comprise overall performance in a way that suggests a correlation is difficult to achieve.

The issues of confidence and competence feature prominently in discussions of OSCEs. Our study found, and this was shared with Lauder *et al* (2008) and Elzubier *et al* (2001) and by Morgan and Cleave-Hogg (2002) that there is an apparent mismatch between the students' self assessment of their confidence and their competence as measured by the OSCE scores. When the questionnaire items were classified to four categories based on core concepts from Practice modules in midwifery, the lack of correlation persisted (table 1).

Barnsley *et al* (2004) also discovered that universally high self-confidence ratings from junior doctors had no correlation to objective assessments of competence when undertaking OSCE type procedures under supervision of teachers.

One explanation may be that a conceptual difficulty remains in the variability of a student's interpretation of the score assigned to any particular competence. One student's 3 can be another student's 6. This entitles us to ask what exactly are we measuring when we attempt to score reports of confidence. While this does not of itself contradict the universal rise across all measures it does show that an element of caution needs to be applied to any interpretation of the results.

Limitations and Recommendations

The study may have benefited from a larger sample and from being repeated with different student cohorts undertaking assessments from other health care disciplines. In this way observed similarities and differences might suggest future areas of enquiry.

It may also have been useful to examine the demographics of our sample more to look for any differences in performance according to age, for example. In addition, we might have expanded the sample further to include a longitudinal aspect to follow-up students as they take up work and progress in their early careers. This could provide information on the relationship of learning as students to performance as practitioners.

Following the example suggested by Morgan and Cleave-Hogg (2002), any concerns over the reliability or objectivity of the OSCE can perhaps be reduced by introducing a patient simulator. This at least would have the advantage of ensuring an exact replication of the experience for each student in that particular station. Allied to Walsh *et al* (2009) who note the psychometric properties of the OSCE this might produce a more uniform overall experience.

So far we have considered limitations and recommendations that remain faithful to the overall shape of the OSCE in the way that they attempt to refine the objectivity of the process. Another way to advance our understanding of the relationship of reported self-confidence to competence would be to conduct a qualitative study based on generating data from interviews and or focus group type settings. This would provide a very different perspective and it may be that an approach that is more open and is itself more iterative and reflexive could get closer to unpicking the complex nature of the student interaction with the OSCE for, as has been demonstrated both here and in the available evidence, confidence and competence are linked but the relationship is far from straightforward.

In summary, although there were significant improvements in students' confidence from before to after OSCE, no significant correlation was observed between self-reported confidence and competence scores in our students. This may be attributed to the complexity of the potential relationship and the limited sample size in our study. Further larger studies with mixed methodology may shed a light on this important area of education and assessment research.

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