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Abstract

Background: This study follows on from a Reid et al. (2014) study that investigated how to develop effective final year medical student assistantship placements, using multi-disciplinary clinical teams in planning and delivery.

Aims: This study assessed the effects on OSCE performance of the in-course enhanced 'super-assistantship' placement introduced to a randomly selected sample of 2013-14 final year medical students at Leeds medical school.

Methods: This study used quantitative data analysis to compare the global grades of OSCE stations between students who undertook this placement against those who did not.

Results: There was a small overall improvement in the 'super-assistantship' student scores across the whole assessment (effect size = 0.085). 'Pre-op Capacity', 'Admissions Prescribing' and 'Hip Pain' stations had small-medium effect sizes (0.226, 0.215 and 0.214) in favour of the intervention group. Other stations had small effect sizes (0.107-0.191), mostly in favour of the intervention group.

Conclusions: The 'super-assistantship' experience characterised by increasing student responsibility on placement can help to improve competence and confidence in clinical decision-making ' in a simulated environment'. The clinical environment and multi-disciplinary team must be ready and supported to provide these opportunities effectively. Further in-course opportunities for increasing final year student responsibility should be developed.

Practice points

- Widespread research into medical graduate 'preparedness' for clinical practice has been undertaken with concerns for patient safety.
- In the UK, the introduction of a final year 'assistantship' period aims to prepare students more fully for practice by providing opportunities to carry out junior doctor duties under supervision.
- An in-course 'super-assistantship' period was introduced at Leeds medical school as a pilot project. This involved intensive work with placement sites to ensure their 'readiness' to support enhanced assistantship.
- The preparation of placements, as well as students, for the enhanced assistantship period improved OSCE performance, particularly in prescribing skills, a key challenge for junior doctors and an important element of patient safety.

Introduction

In the UK context, the transition from final year medical student to Foundation 1 (F1) doctor has frequently been identified as challenging, with concerns over how well medical schools prepare graduates for practice (Reid et al., 2014). As a result, the perceptions of new doctors' 'preparedness' for clinical practice have been extensively studied in recent years; with the principal explanation for problems with clinical performance being that graduates are not fully 'prepared' for starting work. There is an inherent assumption that, following graduation, newly qualified doctors will immediately be able to apply their knowledge and skills to the challenges of practice, despite being in a new role in an unfamiliar environment. However, the fundamental difficulties in the transition from student to novice professional have

been extensively studied in other fields, with the challenges noted. The need for assigning the appropriate level of work and increasing responsibility in a supportive environment for the novice professional is key (Eraut, 2000, Eraut, 2004, Eraut, 2007).

Since the introduction of the postgraduate Foundation Programme in 2005, with greater support for newly qualified doctors, sequential national surveys have demonstrated improvements in new doctors' own perceptions of their 'preparedness' for practice (Goldacre et al., 2010, Goldacre et al., 2014). More explorative studies in this area have recommended reforms to undergraduate medical education to further improve the perceived 'preparedness' of new doctors. Brennan et al. (2010), who interviewed 31 graduates from a UK medical school, concluded that early clinical experience and opportunities for undergraduates to act in the role of a doctor could help to prepare them for their future duties. Similarly, Illing et al.'s (2008) report on the preparedness of graduates for medical practice concluded that new doctors' early performance could be improved by increasing their opportunities as medical students for experiential learning in clinical environments.

It is important to acknowledge that there is a strong critique of the concept of 'preparedness' in the student to doctor transition offered by Kilminster et al. (2011). The authors argue that the current emphasis on 'preparedness' of new graduates overly focuses on the knowledge and skills of the individual learner, thus underplaying social and contextual aspects of the workplace that can affect learning and performance in the new role. This notion separates 'learning' from 'practice' itself, and assumes that if a new doctor is 'prepared'; this means that all of their required learning has taken place before commencing work. Instead, Kilminster et al. (2011) refer to the transition as a 'critically intensive learning period' (CILP) where

the new doctor must become familiar with the practice in their work-setting and develop working relationships with colleagues, before they can begin to work effectively. They argue that in this period, a new doctor's performance is not only affected by his or her own skills and knowledge, for it is also guided by the extent to which the workplace learning culture understands and supports the transition as a CILP.

Nevertheless, the 'preparedness' concept, supported by the conclusions from the Illing et al. (2008) report, has heavily influenced the introduction of the requirement for final year students to undertake an 'assistantship' period, where the student 'acts as an F1 doctor's assistant, with defined duties under supervision' (GMC, 2009).

The reasoning behind the introduction of assistantships was that this period of 'acting up' as an F1 would provide students with a phase of increased responsibility, with opportunities to participate more fully in F1 tasks, helping them to be better 'prepared' for their own future practice (Illing et al., 2013).

The assistantship initiative is partly informed by the work of Lave and Wenger who proposed the concept of 'situated' learning to emphasise the importance of contextualised learning through 'participation in a community of practice' (Lave and Wenger, 1991). This theory states that learning in a work-setting takes place through opportunities for gradually increasing levels of participation and responsibility, alongside the learner's evolving practitioner identity in the workplace community. In keeping with this, a period of assistantship allows undergraduates to take on greater responsibility than they would normally have as final year students and to 'feel like' a junior doctor. One example of this is in having more opportunity to prescribe under supervision which has been included as a requirement by the GMC in the list of assistantship skills, partly as a result of concerns over a lack of prescribing skills of

junior doctors (Illing et al., 2013). Assistantship is therefore intended to give a more practice-based opportunity to learn to act as an F1 under supervision before actually becoming one.

Although the assistantship is a relatively new phenomenon, studies have demonstrated that it can improve student perceptions of their own 'preparedness' for various aspects of practice (Braniff et al., 2015, Fullbrook et al., 2015, Lightman et al., 2015). However, individual perceptions of preparedness are no guarantee of actual practice performance (Monrouxe et al., 2014) and, as argued by Kilminster et al. (2011), the focus on individual skills and knowledge, rather than the individual in the context of the 'placement environment' is of concern. The latter point is taken up by both Reid et al. (2014) and Burford et al. (2015) who independently investigated how learning opportunities were likely to be affected by the placement learning environment and the learning culture of the multi-disciplinary team.

Context

This study follows on from the Reid et al. (2014) study, where a pilot educational intervention study to enhance assistantship experience was undertaken in Leeds medical school. The research team worked intensively in partnership with multidisciplinary teams in three final year placement sites to assess and support their readiness to provide enhanced assistantship placements. These so called 'super-assistantship' (SA) placements provided an intensive in-course experience for a sample of students, as distinct from the mandatory period of assistantship undertaken by all students, post-final examinations, in the medical school involved. The findings of this study revealed the importance of taking account of the 'readiness' of placement teams and of the institutional culture in providing an

enhanced final year assistantship experience where opportunities and risk were finely balanced in the period of 'acting up' as an F1 (Reid et al., 2014).

Evaluation of this educational intervention and the findings from it are reported in Reid et al. (2014). The SA intervention study had been completed and the student cohort had graduated before this retrospective analysis of final year OSCE performance was conducted.

Research Study

Following on from the Reid et al. (2014) study, this study aimed to assess the outcomes of the SA enhanced experience through investigating the impact, if any, on exam performance in the final year Objective Structured Clinical Examination (OSCE). The exploration focused on 'global grades' in the OSCE which are awarded based on the examiner's overall judgement of a student's performance during an OSCE station (Regehr et al., 1998). The hypothesis of the study was that the experience of undertaking an intensive period of performing as an F1 doctor during an SA period would improve the overall observed performance of practice in a simulated assessment environment in the OSCE.

This study was designed to complement the ongoing research project investigating the impact of final year in-course super-assistantships, with the intention that the findings would inform the continuing development and improvement of the SA period at the medical school in Leeds, and in understanding the transition from student to junior doctor more generally.

Methods

In the 2013-14 final year cohort in Leeds there was a total of 246 students who all received a mandatory period of assistantship after the final examinations. In addition

to the mandatory period of assistantship, 89 randomly allocated students were also assigned SA placements throughout the year in the sites where this enhanced final year placement had been established, following the work of the research team (Reid et al., 2014).

The final year rotation of placements at Leeds consists of six four week placements. For the randomly allocated students, the SA placements took place instead of one regular placement within the time period of the normal final year rotations. The remaining 157 students completed their normal rotation of placements.

Our study design can be considered as a retrospective randomized control trial, comparing the global grades in the OSCE achieved by students who undertook the SA against those that did not. Ethical considerations for this retrospective analysis of exam performance included approval for the authors to have access to anonymised assessment data and a requirement to report results back to the medical school so that if the hypothesis was supported, this would ensure that any benefits could be applied to the whole student body in the future. Ethical approval for the study was granted by University of Leeds, Medicine and Health University Ethics Review, reference SoMREC/14/029.

The 2013-14 Leeds MBChB final year OSCE was a sequential examination in two parts (Pell et al., 2013), assessing a range of communication, clinical examination & procedural skills. As all students participated in the first part of the sequence only, these thirteen stations were used in the analysis presented in this paper. Global grade exam data for each station was previously collected as part of the routine assessment processes. For the purpose of this research and prior to analysis, the data was anonymised and separated on the basis of students who had experienced the SA against those who had not. The original global grades were categorised as:

'Excellent', 'Very Good', 'Clear Pass', 'Borderline' and 'Clear Fail'. Global OSCE grades were deemed to be more suitable in this project than checklist scores as checklist scores have received criticism for their potential to trivialise OSCE stations, by making candidates follow a single fragmented approach (Cox, 1990, Wilkinson et al., 2003). Conversely, global grades are considered to be a more holistic method of assessing OSCE performance, evaluating a broader set of skills (Regehr et al., 1998). These could be regarded as a better indicator of future practice than checklist scores as the latter are both highly content-specific and argued to be an invalid measure of increasing clinical competence and experience (Regehr et al., 1998, Hodges et al., 1999). In relation to this study, the internal consistency reliability estimates for both the checklist scores and the global grades were calculated as Cronbach's alpha 0.60 and 0.63 respectively for the first sequence exam, projecting to 0.74 and 0.77 for the full sequence.

Analysis

IBM SPSS version 22 (IBM, 2013) was used to conduct analysis on the exam data. Cross-tabulation was performed on each station, in order to summarise the data into frequencies and percentages for each global grade category, for both the SA and non-SA samples. The grade profiles of the two samples on each station were compared using chi square tests for linear association, to take into account the natural ordering of the OSCE grades. Cramer's V was used as a measure of effect size.

In addition, similar analysis was carried out using the collective data across all the stations, to compare the overall frequencies and percentages of grade categories between the two samples across the whole assessment. Throughout the analysis,

the focus was on effect sizes rather than p-values (Cumming, 2012), and no correction was made for multiple testing.

Results

The majority of stations showed a small positive shift in SA grade profile, in terms of the proportions of Clear Pass to Excellent grades. The most noticeable positive changes were on the 'Pre-Op Capacity', 'Admissions Prescribing' and 'Hip Pain' stations. This was reflected in the small-medium effect sizes (Cohen, 1988) for these stations. 'Admissions Prescribing' and 'Hip Pain' also had statistically significant results for the chi square tests for linear association. The majority of the other stations had small but non-significant effect sizes (0.107-0.191) from the intervention. The two exceptions to the positive shift in grade profiles were the stations 'Venepuncture, Prescribe Blood' and 'Epilepsy', where the non-SA group performed slightly better.

More broadly, the whole assessment cross-tabulation also showed a positive shift in the overall grade profile for the SA sample – for example, 19.9% of the non-SA group grades were 'Fail' or 'Borderline' compared to 14.6% for the SA group. The overall effect size was 0.085.

Given the design of the study, where students were randomized to groups, we can be confident that the emerging patterns of difference in performance described above are related to having undertaken the SA experience.

(Insert Table 1 here)

Discussion

Main findings and interpretation

The greatest differences between students (SA vs non-SA) were observed in relation to the 'Admissions Prescribing', 'Hip Pain' and 'Pre-Op Capacity' stations. The improved scores on the 'Admissions Prescribing' station for the SA students are particularly interesting, since other research has identified prescribing as a task that is especially difficult to learn as a student (Rothwell et al., 2012). Equally, the GMC has identified a lack of expertise in prescribing as problematic in junior doctors and thus emphasised this as a key skill for students to practice during the post-finals assistantship period (GMC, 2011).

It is likely that the improvements in the SA student scores for "Admissions Prescribing" were due to the increased responsibility given to students during the SA, where opportunities to prescribe under supervision were available and indeed encouraged (Reid et al., 2014). The SA placed specific emphasis on the process of learning this skill, and the provision of such opportunities has shown a clear benefit, demonstrating that 'situated' learning has taken place in practice.

However, it should be acknowledged that although the increased responsibility given to students in the SA is likely to be accountable for the improvements, the previously identified difficulties for undergraduates learning to prescribe may be due to prescribing being identified as a risky activity on placement that requires time and effort to manage safely.

With regard to the design of the SA period, this was handled with preparatory workshops that were undertaken with the placement teams of the pilot super-

assistantship sites which encouraged and supported placement sites to become 'ready' to invest in this time and effort to supervise students safely (Reid et al., 2014).

Thus, alongside identifying the value of increased responsibility on student prescribing skills, these findings also demonstrate the importance of the 'readiness' of the placements to support prescribing in the SA model, in that the reciprocal relationships between the student and learning environment 'allowed' and supported students in taking a more active role.

The 'Admissions Prescribing' grade distributions show that it was the most challenging station for both the SA and Non-SA samples. However, 81% of SA students achieved a 'Clear Pass' grade or higher on this station compared to 64% in the Non-SA group. To further interpret these results it is helpful to reflect on the nature of the global grade, which constitutes an examiner's overall judgement of a student's performance in an OSCE station (Regehr et al., 1998). It should be recognised that the majority of the SA students achieved a 'Clear Pass' which is not a perfect grade, implying room for improvement. However, in the final year OSCE, a 'Clear Pass' could be assumed to indicate that a student's performance was perceived to be corresponding with that of a safe, practicing F1 doctor. The SA group's enhanced performance does suggest that the period helped the majority of SA students to develop the necessary understanding and skills to perform safe prescribing in an authentic simulation context. This is a positive outcome as prescribing has been identified as the most important learning opportunity to be gained from an assistantship period (Tallentire et al., 2012).

In discussion of the effects of the SA period on prescribing skills it is important to acknowledge that the 'Venepuncture, Prescribe Blood' station had a slightly better

grade profile from the non-SA group. Although this goes against the previous discussion of the benefits of the SA on prescribing, it should be recognised that transfusion prescribing is a separate entity to medication prescribing, and was not a particular focus of the SA period (Reid et al., 2014). Equally the differences between the two groups for this station are small, with low proportions of failures for both groups, in comparison to the 'Admissions Prescribing' station.

It is more difficult to speculate on the other stations, for the SA was not designed to provide specific preparation for individual OSCE scenarios. Each student has their own particular experience gained from clinical exposure and personal study throughout medical school, which affects their performance in a final year OSCE. However, the design of the SA was intended to provide students with a contextualised enhanced experience of work place learning, with added responsibilities and more opportunities to act as a doctor. These opportunities were intended to improve student competence and confidence in the F1 doctor role (Reid et al., 2014).

There is a general pattern of benefit for the SA group across the majority of stations, in terms of the proportions of Clear Pass to Excellent grades, even though only a minority reach statistical significance.

The distribution of grades in the overall comparison is clearly in favour of the SA, whilst we acknowledge that the effect size (0.085) for this difference is quite small. This is fairly typical of educational interventions which tend to have small effect sizes.

When considering these results it is also important to consider that in order to provide situated learning opportunities through increased participation, an

assistantship period requires each individual student to be engaged and partaking in the F1-related tasks. Previous assistantship research has shown that this is not guaranteed; as students do not always utilise every learning opportunity presented to them (Burford et al., 2015). However, the emphasis of the SA was on the 'readiness' of the placement to support greater participation of students in the work of the practice setting (Reid et al., 2014). Thus the interpretation of these results relies on the understanding that when the workplace is made ready to support the student during the SA period, providing them with more learning opportunities allows the student reciprocally to feel more involved and engaged (Billett, 2001). In summary, the findings support the initial project hypotheses in that the SA has been seen to positively affect global OSCE grades.

Limitations and strengths

Interpretation of these findings should be tentative for a number of reasons. This study, although part of an ongoing research project, was only conducted to assess the potential impact of a model at an individual medical school where intensive work has been done with placement teams to improve their readiness for supporting the super-assistantship period and therefore generalisability may be limited.

As far as we know, this research is the first to attempt to objectively assess the benefits of the SA through comparing OSCE examination grades. As the selection process for the two samples was random, this does strengthen the evidence that the results provide. However, in consideration of a broader limitation, although the OSCE is renowned as a 'gold-standard' assessment of clinical performance, it must be acknowledged that this is conducted in simulated scenarios which may not fully capture the complexities of clinical practice (van der Vleuten, 2000, Khan and

Ramachandran, 2012). This aspect restricts predictions that can be made on the effects of the SA on students' actual future practice.

However, the final year OSCE is part of a summative programme of assessment, of which completion allows a student to graduate and begin work as an F1 doctor. For this reason, the exam would aim to replicate actual practice as much as possible, in order to give the best representation of a graduate's behaviours in the future.

Furthermore, this research uses global grades, awarded by experienced senior clinician examiners, which intend to more holistically assess an examinee's approach to a station and evaluate a broader range of skills (Regehr et al., 1998, Ilgen et al., 2015). Thus, these grades, in comparison to checklist scores, would arguably relate more to the methods, skills and overall performance attributed to a practicing doctor. It would therefore be reasonable to assume that final year global OSCE grades, whilst recognising their limitations, have some predictive value in relation to actual practice.

Conclusions and implications

In conclusion, the SA period has been observed to have measurable positive effects on assessed performance in a simulated setting. The potential for improvements in prescribing performance from the period is exciting, and supports the underlying theory and previous research on the learning opportunities provided by super-assistantships. As prescribing is an essential skill that has been repeatedly identified as challenging to learn, this research recommends further extension of the opportunity for all final year students to experience an SA placement in future years. Although further research is required to assess the longer-term impact on practice of having undertaken an SA placement, this research does support the findings of Reid

et al. (2014) regarding the value of considering and improving the 'readiness' of placement teams to support an enhanced assistantship period. In essence, placing greater emphasis on increasing the readiness of placement teams to support undergraduate medical students in the transition, as well as in the preparedness of students, has the potential to improve the transition to junior doctor and ultimately improve patient safety.

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Declarations of Interest

The authors report no declarations of interest.

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Table 1: OSCE station cross tabulation, Chi square tests for linear association and effect sizes

OSCE Station	Group	Grade frequency (%)					p-value	Effect size
		Fail	Borderline	Clear Pass	Very Good	Excellent		
Pre-op Capacity	Non-SA	5 (3.2)	28 (17.8)	62 (39.5)	44 (28.0)	18 (11.5)	0.082	0.226
	SA	1 (1.1)	5 (5.6)	39 (43.8)	38 (42.7)	6 (6.7)		
Admissions Prescribing	Non-SA	21 (13.4)	39 (24.8)	59 (37.6)	29 (18.5)	9 (5.7)	0.006	0.215
	SA	3 (3.4)	14 (15.7)	45 (50.6)	19 (21.3)	8 (9.0)		
Hip Pain	Non-SA	4 (2.5)	35 (22.3)	82 (52.2)	32 (20.4)	4 (2.5)	0.001	0.214
	SA	0 (0)	12 (13.5)	42 (47.2)	28 (31.5)	7 (7.9)		
Pneumonia Management	Non-SA	6 (3.8)	34 (21.7)	74 (47.1)	31 (19.7)	12 (7.6)	0.213	0.191
	SA	2 (2.2)	15 (16.9)	37 (41.6)	32 (36.0)	3 (3.4)		
Venepuncture, Prescribe Blood	Non-SA	6 (3.8)	25 (15.9)	67 (42.7)	44 (28.0)	15 (9.6)	0.524	0.178
	SA	5 (5.6)	18 (20.2)	26 (29.2)	23 (25.8)	17 (19.1)		
VTE Risk Assessment	Non-SA	5 (3.2)	22 (14.0)	78 (49.7)	43 (27.4)	9 (5.7)	0.095	0.146
	SA	1 (1.1)	13 (14.6)	34 (38.2)	33 (37.1)	8 (9.0)		
Neurological Examination	Non-SA	3 (1.9)	17 (10.8)	68 (43.3)	55 (35.0)	14 (8.9)	0.379	0.109
	SA	3 (3.4)	8 (9.0)	33 (37.1)	32 (36.0)	13 (14.6)		
Handover	Non-SA	5 (3.2)	26 (16.6)	75 (47.8)	42 (26.8)	9 (5.7)	0.15	0.108
	SA	2 (2.2)	9 (10.1)	44 (49.4)	26 (29.2)	8 (9.0)		
Epilepsy	Non-SA	3 (1.9)	20 (12.7)	58 (36.9)	52 (33.1)	24 (15.3)	0.463	0.107
	SA	2 (2.2)	13 (14.6)	24 (27.0)	32 (36.0)	18 (20.2)		
Certification, Cause of Death	Non-SA	4 (2.5)	19 (12.1)	74 (47.1)	44 (28.0)	16 (10.2)	0.596	0.099
	SA	0 (0)	10 (11.2)	44 (49.4)	26 (29.2)	9 (10.1)		
Cardiovascular Examination	Non-SA	2 (1.3)	23 (14.6)	66 (42.0)	50 (31.8)	16 (10.2)	0.331	0.095
	SA	0 (0)	10 (11.2)	39 (43.8)	28 (31.5)	12 (13.5)		
Respiratory Examination	Non-SA	2 (1.3)	23 (14.6)	70 (44.6)	47 (29.9)	15 (9.6)	0.598	0.083
	SA	0 (0)	14 (15.7)	36 (40.4)	30 (33.7)	9 (10.1)		
Biliary Sepsis	Non-SA	2 (1.3)	17 (10.8)	72 (45.9)	55 (35.0)	11 (7.0)	0.869	0.058
	SA	1 (1.1)	8 (9.0)	46 (51.7)	28 (31.5)	6 (6.7)		
Overall	Non-SA	68 (3.3)	328 (16.1)	905 (44.3)	568 (27.8)	172 (8.4)	0.19	0.085
	SA	20 (1.7)	149 (12.9)	489 (42.3)	375 (32.4)	124 (10.7)		

