The effects of human factor related issues on assessors during the recruitment process for general and vascular surgery in the UK

DSG Scrimgeour^{1,2}, R Patel³, N Patel³, J Cleland¹, AJ Lee¹, AJ McKinley², FCT Smith⁴, G Griffiths⁵, PA Brennan³

¹University of Aberdeen, UK

²NHS Grampian, UK

³Portsmouth Hospitals NHS Trust, UK

⁴University of Bristol, UK

⁵NHS Tayside, UK

ABSTRACT

INTRODUCTION Healthcare professionals increasingly recognise how human factors (HF) can contribute to medical error. An understanding of HF is also important during other high stakes activities such as summative assessments or examinations. National organisations hosting such events need to be aware of potential fatigue, boredom and stress that can occur in interviewers during these often repetitive activities.

METHODS A previously validated questionnaire based around the well known HF analysis and classification system (HFACS) was used to evaluate four factors (care and support, asking questions about the role as an interviewer, working within the rules and boundaries, and stress and pressure) at the 2018 UK general and vascular surgery trainee national selection process.

RESULTS A total of 92 questionnaires were completed and analysed (48% response rate). After recoding for negative phrased questions, no significant differences were found between years of experience in the selection process and mean scores obtained for all four factor items. Interviewers had a positive experience during national selection with mean factor scores ranging from 3.84 to 3.98 (out of a maximum satisfaction score of 5).

CONCLUSIONS Organisations need to plan carefully and recognise the human element to ensure that their interviewers are cared for during any high stakes assessment such as national selection. Our work suggests that a positive assessor experience will further help contribute to a reliable and fair recruitment process.

KEYWORDS

Human factors – National selection – Surgery – Assessor – Interviewer – Organisation

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CORRESPONDENCE TO

Duncan Scrimgeour, E: duncan.scrimgeour@nhs.net

Awareness and appreciation of human factors (HF) and their contribution to medical error has been well known for many years.^{1–4} Healthcare has learnt much from aviation, where HF has been widely taught to airline pilots since the beginning of the 1990s.⁵ While it is clear that aviation and healthcare are distinct professions, the implementation of basic HF principles in daily clinical practice is increasingly accepted and practised by clinicians; this results in reducing errors and serious adverse events, enhancing patient safety and improving staff performance.^{1,2}

An understanding of several factors common to healthcare and other high risk organisations (such as the nuclear industry, air traffic services and aviation), including safe teamworking,^{2–4} communication,^{1,6,7}

leadership,^{2,5} fatigue, burnout and stress, are essential in helping to minimise human error.^{8–10} Error due to the ‘human element’ can be simplified and categorised into four main domains or levels: organisational influences, unsafe supervision, preconditions to unsafe acts and unsafe acts themselves (Table 1).

The Human Factors Analysis and Classification System (HFACS), which is widely used to assess these four domains, has been modified for use in healthcare. HFACS includes both active failures (errors resulting from the attitudes and actions or decisions of individual professionals) and latent failures (errors resulting from the failings of an organisation).¹¹ The Swiss cheese model illustrates how failures aligning at multiple levels can result in an error. For most major errors, deficiencies will occur in all levels,

Table 1 Interviewer demographics at the 2018 general and vascular surgery national selection process

Demographics	<i>n</i>
Sex	
Male	75 (82%)
Female	17 (19%)
Interview experience	
0–5 years	52 (57%)
6–10 years	25 (27%)
>10 years	4 (4%)
Missing information	11 (12%)

with the final act (eg wrong site surgery) being the culmination of multiple system failures.¹²

HF research in the clinical setting is increasing and most surgeons will be aware of its importance in safeguarding patients. Despite this, relatively little research has been published on the possible role that HF might have on an individual's performance and morale during national high stakes events, for example during long days of repetitive examining or at other national assessment activities. Repetitive tasks such as examining the same scenario all day at the high stakes objective structured clinical examination (OSCE) of the Membership of the Royal College of Surgeons (MRCS) exam have an adverse effect on examiner morale and increase their stress levels.¹⁵ Following changes in OSCE delivery, including increasing the duration of regular breaks and allowing examiners to change scenarios at lunchtime, morale has been significantly improved.¹⁴

Morale itself is dependent on a good work–life balance.¹⁵ However, appreciation and awareness of the importance of maintaining morale, and reducing stress and pressure during professional commitments such as OSCE examining or recruitment of trainees (held nationally in the UK), is essential, not only to ensure that these events are as fair as possible for candidates and run as well as possible but also to maintain the interest and support of colleagues in these important processes.

To our knowledge, no other research group has published on the potential role of HF in interviewers during the busy days of the recruitment process, which is used to select candidates for specialty training. National selection is now employed for most specialty recruitment throughout the UK, its aims being to reduce selection bias, improve standardisation and consistency, and reduce running costs. The system requires assessors to concentrate for long hours over several days. They must observe and score specific prepared tasks (called stations) using standardised scoring sheets; this is similar to examining for an OSCE. The work is repetitive for interviewers, who may participate in scoring up to 80 candidates over the course of a selection week.

Our hypothesis was that as the recruitment process is similar to an OSCE with large numbers of applicants, it might lead to boredom, stress, pressure, fatigue and possible deviation among the assessors. A questionnaire was employed to survey the interviewers across the five-day selection period. Our aim was to evaluate whether they experienced any negative effects as a result of the recruitment design, culture and overall process, which could potentially have an adverse influence for candidates.

Methods

This cross-sectional questionnaire study utilised our validated questionnaire, which was developed to assess the role that HF might play in the MRCS OSCE and influences that could affect examiners' attitudes towards this exam.¹⁵ In order to ensure that the questionnaire was completely relevant to the national selection process, 'exam' was substituted with 'selection'. As this was the only change made, the overall validity of the questionnaire remained unaltered. The questionnaire was based on the four factors identified previously from the original HFACS domains:¹⁵

- > Factor 1: Care and support of assessors
- > Factor 2: Asking questions about the role as an interviewer
- > Factor 3: Keeping within rules and boundaries of the selection process
- > Factor 4: Stress and pressure

All 38 questions were graded using a five-point Likert scale, which ranged from strongly disagree (1) to strongly agree (5). In order to reduce acquiescence bias, half of the questions were worded negatively and half positively. Questionnaires were distributed at the beginning of each day (5-day recruitment process) and collected at the end of the day.

All 193 assessors present over the 5 days of the 2018 UK general and vascular specialty national selection process were invited to complete the questionnaire. General and vascular surgery recruitment was chosen because the high number of candidates interviewed each year is similar to the number of UK candidates attempting the MRCS exam annually.^{13,14,16}

Results

A total of 92 questionnaires were returned (48% response rate), 81 having been fully completed. In 11 questionnaires, the only missing data were for years of experience. The majority (82%) of the participants were male, and over half (57%) had between one and five years of selection interview experience (Table 1).

The mean scores were very similar for the four factors under investigation (Table 2). No statistically significant differences were found between mean factor scores and years of interviewer experience (factor 1: $p=0.525$, factor 2: $p=0.071$, factor 3: $p=0.807$, factor 4: $p=0.816$). When comparing the data for male and female assessors, a significant difference was found for factor 2 (asking questions about

Table 2 Mean scores from questionnaire responses of interviewers for the 2018 general and vascular surgery national selection process	
Factor	Mean score (95% CI)
F1: Care and support of assessors	3.93 (3.83–4.03)
F2: Asking questions about the role	3.98 (3.89–4.06)
F3: Keeping within rules and boundaries	3.84 (3.76–3.92)
F4: Stress and pressure	3.92 (3.79–4.05)
CI = confidence interval	

the role), with female interviewers giving a higher score than men, but no other significant differences in mean scores were demonstrated between the sexes for the three remaining factors (Table 3).

Discussion

Selection into higher surgical training in the UK takes place via a national process, overseen by the local education and training boards and the Joint Committee on Surgical Training. The running of these high stakes events requires knowledge, careful planning and experience. The system also necessitates the engagement of assessors in a way not dissimilar to the organisation of a professional examination. In a time where some are questioning the fairness of high stakes postgraduate medical examinations in the UK,¹⁷ we wanted to address the potential and preventable causes of human error that might interfere with the smooth running of selection into higher surgical training.

The results from this study provide reassurance to the national selection committee, interviewers and candidates. Overall, assessors reported positively for all four factors and their replies did not reveal any significant stress or pressure (mean score for factor 4: 3.92). This is particularly

heartening as the effects of stress and pressure on morale and performance in whatever task is being performed can adversely influence mental workload.^{18,19}

One way to improve the morale of examiners in the MRCS is to move them to a different scenario/station regularly.^{13,16} However, the mean scores for the four HF areas assessed in the general and vascular surgery selection process were high, implying that there are no issues with repetition or boredom for interviewers in this system. A significant difference was noted in the mean scores for male and female selectors for factor 2 (asking questions about the role), possibly because women appear to be better communicators.^{20–22} It is of course still encouraging that both sexes overall reported positively for this factor.

Study limitations

Weaknesses of this study include its observational design encompassing only a single cohort of assessors over one recruitment process. Those who completed the questionnaire are potentially more likely to be committed to the national selection system than those who did not. Nevertheless, the overall positive experience of interviewers reflected in our survey is reassuring and supports the findings of another study from 2018, which assessed HF in the trauma and orthopaedic selection process.²⁵

Another limitation is that participants completed their questionnaire after each day of interviewing, which may not completely reflect their entire experience during the five-day event. On the other hand, task repetition and continually assessing the same scenario throughout a day can significantly increase examiner stress.¹⁵ Further research should compare factor scores for interviewers who are present for only one day of the national selection process and for those who are there for the entire event. Another important issue that was not addressed in the current study was the possible effect of differential rater function over time (DRIFT). DRIFT has been found to reduce the reliability of marks awarded during communication OSCE stations²⁴ and future research could investigate whether DRIFT exists in the setting of national selection.

Table 3 Mean scores from questionnaire responses of male (M) and female (F) interviewers for the 2018 general and vascular surgery national selection process			
Factor	Mean score	Mean difference (95% CI)	p-value
F1: Care and support of assessors	M 3.95	0.12 (-0.14 to 0.37)	0.352
	F 3.83		
F2: Asking questions about the role	M 3.93	-0.25 (-0.47 to -0.04)	0.021
	F 4.18		
F3: Keeping within rules and boundaries	M 3.83	-0.07 (-0.27 to 0.14)	0.528
	F 3.89		
F4: Stress and pressure	M 3.86	-0.30 (-0.63 to 0.03)	0.070
	F 4.16		
CI = confidence interval			

Conclusions

Assessors who completed our validated questionnaire reported an overall positive experience during the UK national selection days for general and vascular surgery. In order to minimise possible sources of error or unwanted bias, it is important to consider the potential effect that HF (including boredom and fatigue) can have on performance when planning any high stakes process. It was reassuring that no significant HF issues were identified that could potentially influence selector behaviour during this situation, where there is a great deal at stake for candidates. This can only be beneficial for the candidates' experience.

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