STUDENT TEACHING AND EVALUATION

Performance criteria for emergency medicine residents: a job analysis

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ABSTRACT

Objective: A major role of admission interviews is to assess a candidate's suitability for a residency program. Structured interviews have greater reliability and validity than do unstructured ones. The development of content for a structured interview is typically based on the dimensions of performance that are perceived as important to succeed in a particular line of work. A formal job analysis is normally conducted to determine these dimensions. The dimensions essential to succeed as an emergency medicine (EM) resident have not yet been studied. We aimed to analyze the work of EM residents to determine these essential dimensions.

Methods: The "critical incident technique" was used to generate scenarios of poor and excellent resident performance. Two reviewers independently read each scenario and labelled the performance dimensions that were reflected in each. All labels assigned to a particular scenario were pooled and reviewed again until a consensus was reached.

Results: Five faculty members (25% of our total faculty) comprised the subject experts. Fifty-one incidents were generated and 50 different labels were applied. Eleven dimensions of performance applied to at least 5 incidents. "Professionalism" was the most valued performance dimension, represented in 56% of the incidents, followed by "self-confidence" (22%), "experience" (20%) and "knowledge" (20%).

Conclusion: "Professionalism," "self-confidence," "experience" and "knowledge" were identified as the performance dimensions essential to succeed as an EM resident based on our formal job analysis using the critical incident technique. Performing a formal job analysis may assist training program directors with developing admission interviews.

Keywords: interview, personnel selection, emergency medicine, postgraduate education

RÉSUMÉ

Objectif : L'un des principaux rôles des entrevues d'admission est d'évaluer si un candidat est apte pour un programme de résidence donné. Les entrevues structurées sont plus fiables et valides que les entrevues non structurées. L'élaboration du contenu d'une entrevue structurée est généralement fondée sur les dimensions du rendement que l'on juge importantes pour réussir dans un travail. Habituellement, on fait une analyse d'emploi formelle pour déterminer quelles sont ces dimensions. Or, les compétences requises pour qu'un résident en médecine d'urgence (MU) réussisse n'ont pas encore été étudiées. Nous avons cherché à analyser le travail de résidents en MU afin de cerner ces compétences essentielles.

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Presented at the Canadian Association of Emergency Physicians Annual Scientific Assembly, June 4, 2006, Victoria, BC

Submitted Aug, 3, 2007; Revised Apr. 1, 2008; Accepted Apr. 22, 2008

This article has been peer reviewed.

CJEM 2008;10(6):539-44

Méthodes : Nous avons utilisé la « technique de l'incident critique » pour générer des scénarios de rendements médiocres et excellents chez les résidents. Deux examinateurs ont lu séparément chaque scénario et repéré les dimensions de rendement qui étaient prises en compte dans chacun d'eux. Tous les qualificatifs attribués pour un scénario donné ont été regroupés et analysés à nouveau jusqu'à l'obtention d'un consensus.
Résultats : Cinq membres du corps professoral (25 % de notre corps professoral) constituaient les experts en la matière. Cinquante et un incidents ont été générés et 50 qualificatifs ont été appliqués. Onze dimensions du rendement s'appliquaient à au moins 5 incidents. Le « professionnalisme » était la dimension à laquelle on accordait le plus de valeur; elle était représentée dans 56 % des incidents, suivi de la « confiance en soi » (22 %), de « l'expérience » (20 %) et des « connaissances » (20 %).
Conclusion : On a déterminé, selon une analyse d'emploi formelle et à l'aide de la technique de l'incident critique, que le « professionnalisme », la « confiance en soi », « l'expérience » et les « connaissances » étaient les dimensions de rendement essentielles pour réussir comme résident en MU. Le recours à une analyse d'emploi formelle pourrait aider les directeurs de programmes de formation à préparer des entrevues d'admission.

Introduction

Surveys of program directors in multiple specialties have shown that personal interviews are regarded as the most important screening tool in resident selection.[1–7] Some of the major roles of admission interviews are to assess candidates' noncognitive skills and compatibility with a residency program.[4,7–9] The reliability and validity of structured interviews are consistently reported to be higher than those of unstructured interviews.[5,10–15]

The content of a structured interview needs to be built around the dimensions of performance that are deemed necessary to succeed in a particular line of work. In other fields, a formal job analysis is conducted to determine these dimensions.[5,11,13,16–18] The dimensions of performance that are essential to succeed as a resident in emergency medicine (EM) have not been identified. This study endeavours to determine these essential dimensions by conducting a formal job analysis of the work done by EM residents.

Methods

Study design

In our prospective study, a focus group of EM faculty members performed an analysis of the work of EM residents to extract the essential dimensions of performance.

Study setting and population

The study took place at Queen's University, Kingston, Ont. The study focused on critical incidents involving the resident population enrolled in the 5-year EM training program accredited by the Royal College of Physicians and Surgeons of Canada. At the time of the study, the EM department comprised 20 full-time members and 7 adjunct faculty members.

Study protocol

The critical incident technique as described by Flanagan[19] was used to perform the job analysis. In this technique, subject experts reflect on critical incidents. These critical incidents are actual events that revealed successful and unsuccessful behaviours, attitudes and performances.

Five of our full-time faculty members representing different interest and academic orientations volunteered to form the subject expert group for the study. These faculty members all work clinically with EM residents. The principal investigator facilitated a 2-hour focus group discussion with the subject expert group. Participants were asked to reflect on the previous year and recall incidents of extremely good or extremely poor clinical performance involving EM residents. Participants described each incident and commented on the components that made the performance good or poor. The group met until no further incidents could be generated. The entire discussion was audiotaped. After the incidents had been transcribed as descriptions and edited to remove any identifying features, 2 separate faculty members who were not involved in the generation of these incidents but were members of our department reviewed all incidents and labelled each with 1 or several dimensions of performance that they felt to be represented in the incident. The choice of the actual labels was left with these reviewers; no predetermined set of labels was provided. Labels were transposed into their positive aspect (e.g., "lack of confidence" became "confidence"). All labels applied to an incident were then pooled and the list of merged labels for each incident was submitted to the same reviewers to achieve consensus. As recommended by Flanagan,[19] any incident for which the 2 reviewers could not agree on a common label was eliminated. The result was a set of critical incidents that

https://doi.org/10.1017/S1481803500010769

reflected the dimensions of performance deemed important for an EM resident to succeed. The study was approved by our Research Ethics Board.

Outcome measures

The outcomes of interest were the labels given by the 2 reviewers. These were accepted as representative of the performance dimensions essential for success as an EM resident at our institution.

Data analysis

A descriptive analysis was performed, with measures of frequency. Each dimension was weighted according to its relative frequency within the set of critical incidents.

Results

The 5 subject experts generated 51 critical incidents during a 2-hour focus group meeting. Ten incidents were removed from the final analysis because the reviewers could not agree on at least 1 common label. Figure 1 provides an example of a scenario where reviewers reached agreement on common labels. Figure 2 represents a scenario where agreement was not attained. A total of 156 performance dimension labels were applied to the remaining 41 incidents (mean of 3.8 labels/incident). Some labels were common to several incidents; the number of distinct labels was 50 (Table 1). The most frequently cited dimension of performance, "professionalism," was reflected in 24 incidents, more than double the number of incidents reflecting the next most frequently cited dimension.

Discussion

Our study presents the essential dimensions of performance for EM residents as identified through a formal job analysis. This type of analysis has been described for other fields of medicine. Gilbart and colleagues[20] mailed a questionnaire to program directors and selection committee members of all Canadian orthopedic residency programs asking them to list resident characteristics felt to be essential for success. Although described as a critical incident technique, this method did not involve the generation of critical incidents and was not based on a formal analysis of the work expected of a resident in that specialty. Using Flanagan's technique, Tarico and coworkers[21,22] contrasted the essential dimensions of performance for radiology residents from job analyses performed by both the radiology residents and the attending radiologists. Differences were found in the relative emphasis faculty and residents placed on attitudinal characteristics and interpersonal skills in the residency, with higher rankings of these dimensions from residents. Based on these works, multiple points of view may offer a more complete and representative job analysis. Altmaier and colleagues applied the Flanagan technique to multisite radiology[23] and anesthesiology[24] residency programs. In these studies, faculty members were interviewed individually rather than as a group. Comparison between sites revealed a differential distribution of incidents among performance categories for the anesthesiology program only; the pattern of distribution did not differ between the radiology training sites. The differences seen in the anesthesiology program suggest that the results of a job analysis at one site may not be generalizable to another site.

We ha d a patient who had a catheter put in for hematuria. The catheter was irrigated out, and the patient sent home. He made it as far as the parking lot and came back with more hematuria. When I actually took the history, it boiled down to the fact that the patient had been on antibiotics for a urinary tract infection for about a week before that; but his symptoms weren't well ascertained, they were of overflow incontinence; he had probably been obstructed for several weeks. He was on coumadin, no blood work was done in the emergency department, no blood work was done recently. His creatinine was 600 on the second time he was in. This was a fairly senior resident who didn't actually take any history other than hematuria and didn't bother to look through the chart or the old charts or the medication lists or anything. You've got to know when to slow down; when things are more complicated you've got to slow down, listen to the patient, take the full history. It only takes 5 minutes longer to take the full history than to take a sort of directed history, like what's the problem — hematuria — here's your catheter."

Labels given by reviewer 1	Labels given by reviewer 2	Combined labels (after transposition into positive aspect)	Common labels
Unprofessional	Short-sighted	Professionalism	Professionalism
Poor clinical skills (data collecting)	Careless	Clinical skills	Clinical skills
Unthorough		Thoroughness	
		Short-sighted	
		Caring	

Fig. 1. Example of a scenario where reviewers agree on common labels.

https://doi.org/10.1017/S1481803500010769

Two previous articles report on the attributes felt to be desirable for EM residents[25] and pediatric EM fellows.[26] Table 2 compares these attributes across studies. Bandiera and Regher[25] developed a semistructured interview for assessment of candidates to an EM program. The particular attributes that composed the instrument were selected after review of national and international discussion group documents, previous interview protocols and input from the program's residents and faculty members. Poirier and Pruitt[26] surveyed 43 pediatric EM program directors with a

"I was overhearing a resident who basically was getting talked out of a procedure by the radiology resident. You could tell this person was getting frustrated. He gets off the phone and says, "I can't believe this person was trying to talk me out of ordering this!" His ears were red and his face was red, and I said, "Just remember the radiology resident is there, we need to be respectful of their time and resources, but basically they don't interpret patients, they interpret imaging and they occasionally help us make a decision on the best imaging." Before the shift was over, there was another call on them and the emergency resident was much more direct and definitive and said, "This is what I want done and I'm sending the requisition down." It was operationalized and applied information with a rapid turn around; "This is the way I need to do it, this is the way I'm going to do it." It was the fact that they learned from one discussion to the other. There was an opportunity to apply it fairly quickly. It's this whole skill set, reproduce or repeat until it's operationalized, but incorporating feedback in a way to change your behavior, change your habit. It's the response to learning and then correcting."

Labels given by reviewer 1	Labels given by reviewer 2	Combined labels (after transposition into positive aspect)	Common labels
Decisiveness	Self-learning	Flexibility	
Confidence	Behaviour modification	Confidence	
Inflexibility		Self-direction	

Fig. 2. Example of a scenario excluded from analysis because of the lack of consensus between reviewers.

Table 1. List of all labels with their absolute and relative frequencies

Labels	Absolute frequency (no.)	% of incidents	Labels	Absolute frequency (no.)	% of incidents
Professionalism	24	58.5	Reliability	2	4.9
Self-confidence	9	22.0	Responsibility	2	4.9
Experience	8	19.5	Role understanding	2	4.9
Knowledge	8	19.5			
Humility	7	17.1	Self-direction	2	4.9
Insight	7	17.1	Short-sighted	2	4.9
Communication	6	14.6	Trustworthiness	2	4.9
Openness	6	14.6	Advocacy	1	2.4
Caring	5	12.2	Commitment	1	2.4
Compassion	5	12.2	Decision-making	1	2.4
Teamwork	5	12.2	Friendly	1	2.4
Consideration	4	9.8	Integrity	1	2.4
Maturity	4	9.8	Intelligence	1	2.4
Confidence	3	7.3	Involvement	1	2.4
Flexibility	3	7.3	Judgmental	1	2.4
Work ethics	3	7.3	Lateral thinking	1	2.4
Clinical skills	2	4.9	Life balance	1	2.4
Collegiality	2	4.9	Multitasking	1	2.4
Critical/analytical thinking	2	4.9	Objectivity	1	2.4
			Patience	1	2.4
Efficiency	2	4.9	Practicality	1	2.4
Hard working	2	4.9	Respect	1	2.4
Honesty	2	4.9	Satisfaction	1	2.4
Humanity	2	4.9	Sense of humour	1	2.4
Interest	2	4.9	Thoroughness	1	2.4
Leadership	2	4.9	Tolerance	1	2.4

https://doi.org/10.1017/S1481803500010769

42-question, self-administered questionnaire, which listed several factors used in ranking applicants. Respondents rated each factor on a 5-point Likert scale as to its relative importance, 1 being unimportant and 5 being critical. The factors selected were not based on formal analyses but rather adapted from a previous study, which was itself based on several other studies in which the performance criteria were identified through literature reviews and surveys of program directors.[27] Balentine and coworkers,[28] Crane and Ferraro,[29] and Hayden and colleagues[30] have also reported on the predictors of success for EM residents. The focus of their studies, however, was on those factors available to the selection committee at the time of application (e.g., medical school attended, dean's letter, EM rotation grades, interview scores) rather than on the personal characteristics of the applicants. Our results show that professionalism far outweighs any other dimension as the most desirable attribute for applicants to our program. Professionalism was also thought to be primordial in Bandiera and Regher's study,[25] and each of their 4 interview panels rated each candidate on this particular domain, effectively giving professionalism 4 times the weight of other criteria. Professionalism ranked 12th in Poirier and Pruitt's[26] important attributes for pediatric EM fellows, and teamwork ranked first. In our study, teamwork ranked ninth. Some overlap exists between the dimensions expressed by our faculty and those selected in Bandiera and Regher's[25] and Poirier and Pruitt's[26] studies ("professionalism," "insight," "teamwork"). The consistent ranking of these specific domains suggests that they represent the core performance dimensions shared by faculty in all EM programs. Other dimensions such as "self-confidence," "humility" and "compassion" are unique to specific program assessments, and their relative ranking between programs could signal the specific flavour of a particular program.

Limitations

Our study has several limitations. First, the incidents were generated by a small group of faculty members. Although this small group comprises 25% of our total faculty, their opinion might not represent that of the remaining 75%, or of faculty at other institutions. Second, although a minimum of 50 incidents is reported as acceptable for a job analysis, it might not have been sufficient to saturate the dimensions of performance for EM residents.[19] A 2-hour discussion produced 51 incidents and effectively saturated our expert group discussion; repeating the same exercise with another group of faculty might have identified additional desirable dimensions of performance. For complex job situations, Flanagan[19] suggests that up to 4000 incidents might be necessary. Third, the total number of individual labels reached 50. Some labels relate very closely to others, such as compassion and caring; collapsing these separate labels into 1 dimension might have given more weight and a higher final ranking to that particular dimension. Some authors have provided their reviewers with a set of predesignated labels.[22,23] We chose to integrally apply Flanagan's description of the critical incident technique and not select labels a priori. One could repeat the study choosing the CanMeds roles[31] or the ACGME competencies[32] as labels. The restricted number of labels would yield higher relative frequencies but might fail to expose important

Table 2. Comparisons of performance dimensions between studies

Results of current study, % incidents*	Bandiera and Regehr†[25]	Poirier and Pruitt,‡[26] mean (standard deviation)
Professionalism, 59	Ability to achieve balance in life	Ability to work with a team, 4.66 (0.42)
Self-confidence, 22	Ability to manage stress	Compatibility with program, 4.65 (0.35)
Experience, 20	Ethical sensitivity	Commitment to hard work, 4.55 (0.45)
Knowledge, 20	Initiative	Ability to grow in knowledge, 4.41 (0.58)
Humility, 17	Insight into consultant/specialist role	Ability to solve problems, 4.36 (0.63)
Insight, 17	Insight into emergency medicine	Maturity, 4.34 (0.64)
Communication, 15	Leadership ability	Ability to listen, 4.34 (0.65)
Openness, 15	Problem-solving skills	Ability to articulate thoughts, 4.32 (0.59)
Caring, 12	Professionalism	Sensitivity to others' psychosocial needs, 3.91 (0.62)
Compassion, 12	Self-directedness	Relevant questions asked, 3.87 (0.68)
Teamwork, 12	Self-insight	Fund of medical knowledge, 3.85 (0.62)
Consideration, 10	Responsibility	Realistic and self-appraisal, 3.85 (0.66)
Maturity, 7	Teamwork ability	Personal appearance and professionalism, 3.79 (0.66)
Confidence, 7		Level of confidence, 3.79 (0.66)
Flexibility, 7		Knowledge of the specialty, 3.40 (0.88)

*Rank order, % incidents.
†Rank order, alphabetical.
‡Rank order, mean on 5-point Likert scale.

https://doi.org/10.1017/S1481803500010769

dimensions not captured in the preselected labels. Finally, our results may be inadequately generalizable. As seen in the studies by Altmaier and colleagues,[23,24] the relative importance of performance dimensions varies across different training sites, even within a single program. It is conceivable that individual programs need to perform their own job analysis to extract the specific dimensions of performance felt to be essential by their own faculty.

Conclusion

"Professionalism," "self-confidence," "experience" and "knowledge" were identified as the performance dimensions essential to succeed as an EM resident based on our formal job analysis using the critical incident technique. Performing a formal job analysis may assist directors of training programs in developing admission interviews.

Acknowledgements: The authors are indebted to the following emergency medicine physicians who have contributed their time and effort to the realization of this study: Dr. Gene Dagnone, Dr. Gord Jones, Dr. Joseph Newbigging, Dr. H. Michael O'Connor, Dr. Marco L. Sivilotti and Dr. Murray Taylor. This study was made possible through a grant from the Clinical Teachers at Queen's University Endowment Fund.

Competing interests: None declared.

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