Identification of Warning Signs During Selection of Surgical Trainees

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OBJECTIVE: The aim was to document empirical observations about antecedents to and practices of unsuitable behaviours amongst surgical trainees and develop an interview guide that could be used for the selection process.

DESIGN: A mixed methods design was adopted combining a survey distributed to senior surgeons and heads of departments, followed by semi-structured interviews with experienced surgeons.

SETTING: All surgical departments and hospitals in The South Swedish Health Care Region.

PARTICIPANTS: The survey was completed by 54 of 83 eligible surgeons above 50 years of age, and 4 of 7 heads of surgical departments. Semi-structured interviews with 13 surgeons representing local, regional, and university hospitals from the same cohort.

RESULTS: Forty-six (85%) surgeons and four of seven heads of departments responded that they had come across surgical trainees deemed unsuitable to train and work as a surgeon. All heads of department and 31 of 54 of the surgeons believed tendencies towards unsuitability are evident early during training. From the survey, 107 statements described reasons for finding a trainee unsuitable. Qualitative analysis of the interviews and free-text answers of the survey led to identification of 11 problem domains with associated "warning signs". An interview guide to help detect unsuitability tendencies in candidates during selection procedures was constructed.

CONCLUSIONS: Experienced surgeons have quite consistent views on what makes a person unsuitable as a surgeon. Their views have been systematized into 11 problem domains, and a set of 'warning signs' for unsuitable behaviours and traits has been developed. Early detection of these signs and traits is important for the individual, the work environment, and patient safety. A recommendation for a minimum framework for selection including the constructed interview guide is presented. (J Surg Ed 76:684–693. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Surgical education, selection, human factors, patient safety, residency, selection interview

COMPETENCIES: Interpersonal and Communication Skills, Professionalism, Systems-Based Practice

INTRODUCTION

Adverse events in surgery are common, affecting 5% to 15% of all hospital admissions, a majority (62.5%) are estimated to be avoidable, with 3.6% to 4.7 % leading to permanent harm or death.[1] Compared to other high-risk fields, healthcare has not achieved dramatic improvement through systematic safety work to develop into High-Reliability Organisations (HROs).[2,3] In HROs, powerful systems for personnel selection and training exist. Selection of surgical trainees has been proposed to be a "missing link" in the process of reducing adverse events in surgery.[2] It is known that adverse events are to a great extent due to communication errors and nontechnical skills.[4,5]

Recruitment systems vary around the world, with some recruiting directly from medical school and others after internship, and both national and local selection processes exist.[6-11] In general, selection processes tend to follow the strategy of trying to find the best candidate based on a set of criteria. These criteria do not necessarily prevent employment of those who are unsuitable, since some positive, and negative characteristics are in close proximity to each other.

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In the context where selection is based on selection among few candidates, it is important to objectively test for unsuitability to mitigate a detrimental hiring into a training position.

Studies investigating the desirable qualities in basic surgical trainees have resulted in lists of favourable traits.[12-15] However, there is no consensus in the global surgical community concerning what to assess, when, and how to do it.[6-8,11,16-19] Most commonly, selection is currently based on a combination of medical school grades or exams, CVs, reference taking, and nonstructured interviews. Recent studies advocate including and investigating the value of aptitude tests, structured interviews, personality inventories, and situational judgment tests.[7,8,16,20-22] No single test or combination of tests has been identified which with high validity and reliability can predict technical aptitude.[23] This is important since studies have shown that between 8% to 30% will struggle with learning laparoscopy to a proficient level within reasonable time.[24,25]

Studies on problem trainees and remediation have revealed that struggling trainees display issues with nontechnical competencies, such as knowledge, interpersonal skills, and professionalism.[26-30] Bergen et al. found in 2000 that 21% of residents in surgery over a 10-year period were high-risk or problem resident.[31] These residents exhibited deficiencies in interpersonal behaviour, professional behaviour, ethics, cognitive skills, clinical judgement, decision-making, family or health areas, but did not have technical difficulties.[31]

In Sweden, the recruitment process is decentralized and performed at the local level of each hospital. An internship period of 1.5 years follows 5.5 year's studies in medical school. The traditional way to become accepted for a surgical trainee position is by 6 to 12 months employment as a locum. If performance is deemed favourable, a trainee position will follow. Locums perform the same tasks, are treated like surgical trainees and have the same education and training opportunities. They work mostly in emergency departments and acute care.

This article reports on a multidimensional study aimed at documenting experienced surgeon's empirical observations about antecedents to and practices of unsuitable behaviours in the surgical environment. Further, an interview guide based on the findings was developed. We have strategically chosen to call the consolidated and refined results "warning signs".

RESEARCH DESIGN AND METHODS

A mixed method with qualitative and quantitative data acquired from multiple sources was applied. A broad-based questionnaire was distributed to senior surgeons in the South Swedish Health Care Region (SSHCR) and heads of surgical departments. Based on the questionnaire results, a key-informant interview guide was created and administered to 13 experienced surgeons. Data acquired in the questionnaire and key-informant interviews was synthesized and analysed using a constructivist grounded theory approach.[32] Statistical calculations were done in Microsoft Excel, and NVivo was used for qualitative analysis.

Data Collection: Quantitative Survey

A questionnaire with open and closed format questions was sent to 87 experienced surgeons and 7 heads of department heads in the SSHCR. An "Experienced Surgeon" was operationalized as general surgeons over 50 years of age and employed in December 2013 in the SSHCR. The hospitals ranged from university to local hospitals. The survey was mailed, with a maximum of 3 reminders. Surveys were coded, and the list of persons contacted was kept separate from the responses, and the researchers were blinded to the respondent's name.

Data Collection: Qualitative Semi-structured Interviews

A purposeful selection of interview candidates was performed to ensure representation from each hospital category (university, regional, and local), and distribution by age and sex. All interviews were performed by at least 1 experienced sociologist. Twelve interviews were performed on site and one by phone. The interviews probed for descriptions of unsuitable behaviour and situations where this would be revealed, together with descriptions, and characterisation of the opposite, the "ideal" surgeon. Saturation was obtained. All interviews were carried out after informed consent of the interviewed person. All except 1 interview were recorded and later transcribed. One interviewee did not agree to recording, and notes were taken during the interview.

Coding was performed separately by 2 researchers – a specialist surgeon and a sociologist. Both generated a list of codes separately and these were applied to the interview transcripts. The coding process led to the analysis of a standardized set of factors or variables across the total interview material, i.e., a horizontal analysis across the interview data. To understand the thought and argumentation structure of each informant, the interview transcripts were read more than once by 2 researchers, and in some cases the audio files were revisited. This resulted in vertical analyses of each specific interview, which were put in writing, and shared among the members in the research group. The coded material was analysed in the following 5 primary dimensions: (1) what are the basic problems that lead to unsuitability

("problem domains"); (2) what are the basic causes of these problems (personality, lack of physical, or cognitive ability, lack of motivation, etc); (3) what are the behavioural indicators of these problems ("warning signs"); (4) are some behaviours more resistant to change or innate (flexibility); and (5) when, how, and where may those indicators be detected?

RESULTS

Survey

Eighty-seven surveys were distributed to surgeons. Four responses were excluded for analysis: 1 respondent worked at 2 hospitals, 2 did not fulfil the age criteria, and 1 person had retired. Hence, 54 responses from 83 potential respondents (65 %) were included in the study. The median experience as a specialist surgeon was 23 years. Four of seven heads of surgical departments responded (Table 1).

Forty-six (85%) surgeons responded that they had come across surgical trainees they deemed unsuitable to train and work as surgeon. Some 107 statements about the reasons of the respondent for "unsuitability" were categorized into 6 categories: technical ability; judgment; communication and interpersonal factors; personality, personal resources and skills; cognitive ability; and miscellaneous. Statements concerning technical ability was most frequent, in total 23, followed by 22 on communication and interpersonal skills, 18 for personality, personal resources and skills, 17 concerned cognitive ability, 15 for judgment, and 12 in the miscellaneous category.

The heads of departments stated "lack of judgement" (4/4), "not able to work in teams" (2/4), "lack of engagement" (1/4), "overestimating own ability" (1/4), and "lack of competence" (1/4) as reasons for

TABLE 1. Demography of Study Participants. All Numbers in Median (Range) M; Male, F; Female, NN; not Stated

Survey		Surgeons >50 Years of Age	Head of Department
Responders / denominator		54/83	4/7
Age		58 (50-70)	57 (41-59)
Sex	M	41	3
	F	8	1
	NN	5	
Work experience as specialist (Year)		23 (8-45)	17 (5-28)
Hospital type	Local	13	1
	Regional	19	2
	University	22	1
Experience as head of department (year)			1 to 4
Estimated attrition rate (%)			7.5 (0-20)
Current selection process for surgical training			6 to 12 months locum (n = 3)
			Scientific merits (n = 1)
Satisfaction with current selection process?			
1 = not at all satisfied			4 (2-5)
5 = very satisfied			
Encountered unsuitable trainee's? (#yes)		46	4
"Do you believe it is possible to detect signs of unsuitability for surgical training (#yes)	During selection	14	1
	Early during surgical training	31	3
Interviews with surgeons >50 years of age (n = 13)			
Sex	M	9	
	F	4	
Hospital type	Local	3	
	Regional	5	
	University	5	

unsuitability for the surgical profession. Three of 4 heads of department and 31 of 54 (57%) surgeons were of the opinion that it should be possible to detect unsuitability of a trainee early on. Three of 4 heads of departments stated that the selection of trainees was done amongst those individuals that had worked or worked in the clinic as locum, and 1 stated scientific achievement as a selection criterion.

Interviews

Twelve of the 13 interviewees confirmed that they had come across unsuitable colleagues and found that these individuals negatively affected patients as well as the work environment. Responses in the survey and interviews that focused on the organisational context were not further pursued. With focus on inappropriate behaviour, categories known from the core competencies of Accreditation Council for Graduate Medical Education, NonTechnical Skills for Surgeons, Royal Australasians College of Surgeons (RACS), or Royal College of Physicians and Surgeons of Canada framework did not fit all aspects.[12,33-36] Reviewing and revision of codes identified 11 problem domains that were likely to result in unsuitability: indecisiveness, timidity, lack of self-awareness and overconfidence, inability to receive criticism and take instructions, lack of appropriate communication, lack of empathy and instrumentalization of the patient, inability to meet the demands of the job, inability to gain sufficient level of craft proficiency, insufficient cognitive abilities (problem solving, identification, finding), dishonesty, and inappropriate priorities (Table 2). Through further content analysis, behavioural warning signs emerged within each domain that could act as indicators for detecting tendencies towards unsuitability and incompatible with a future role as a surgeon (Table 2). There were some differences of opinion concerning how resistant to change and correction the behaviour displayed within a problem domain were; some were considered more resistant to change than others.

An aspect emphasized explicitly by seven interviewed persons was the need for a trainee to possess realistic assessments of their own knowledge and skills, and ask for help when necessary. Doing this was considered having good judgement and was the most frequently used description of being suitable for the surgical profession. Contrasting unsuitability by describing the opposite was common. A majority of those interviewed mentioned the need to be transparent, honest and to be able to communicate with patients, relatives and colleagues. Further, to be mentally fit to handle complications was considered important. The most feared and dangerous behaviours were hubris, macho attitudes, and putting one's own career aspirations before the well-being of the patient. Trainees seen as challenging and problematic were the ones who did not take instructions and feedback or expressed a view of the patient as a "*training object*", thereby showing lack of empathy.

Doubts about the possibility to change certain personality traits like conscientiousness, honesty, hubris, empathy, self-knowledge, decision-making, stress tolerance, egoism, feedback receptibility, prioritizing and inner motivation or drive for the surgical craft were expressed as: *"Is it possible to learn to have good judgment? I'm not sure. Or learn to know your own limitations, I'm not sure about that either. But to learn to handle a scalpel, about medications and medical knowledge, and gain clinical experience, that is possible. But if you lack judgement, then it is difficult"* (IP13).

Insight that physical fitness, mental strength, and stress resistance are prerequisites for the surgical profession was considered a postulate to manage the long shifts, surgical procedures, night-shifts, and complications. A few mentioned that some trainees seemed to have an unrealistic view on how professional life effects social life. Being realistic about the ability to meet the demands of the surgical profession was considered important and perceived as not always clear to trainees struggling with aspects of prioritizing and stress.

An issue considered important was the need to be a problem-solver and based on knowledge and science be able to change strategy under pressure. Some believed this to be an inherent trait and were sceptical if everyone could master this. Lack of technical ability was not seen as a problem of same magnitude as mental and behavioural issues. A majority expressed the opinion that most individuals can be trained to become fairly good surgeons, and to compensate lower technical abilities with stronger nontechnical skills. Yet some would eventually realize that surgery is not for them. The technical skills area was considered more objective, recognizable and easier to talk about than personal and social dimensions. All surgeons that were interviewed mentioned the ability to work in teams as a prerequisite for surgical training. Individuals that lacked social and communication skills were seen as problematic. Other types of personnel categories were generally considered good sources of information to assess if communication skills and tone were acceptable.

Five interviewees pointed to the lack of control systems within hospitals and within the Swedish health care system to identify unsuitable behaviour in trainees with the possibility to terminate their surgical education if necessary. A barrier to identifying warning signs was fragmented supervision, leading to issues often emerging or being identified first after 2 to 3 years of surgical training. Faculty meetings were held at some hospitals,

but the question of suitability for the surgical profession was sensitive to discuss. The interviewed surgeons also mentioned a cultural context where "*no one wanted to be the one with the axe*" (IP12) and that this lack of "courage" led to unsuitable individuals being allowed to proceed. Lack of adequate reference-taking was described as a reason for accepting unsuitable candidates. A common practice described was "*turfing*" (to find any excuse to refer a trainee to a different department or team).

No respondent in the survey or interviews expressed negative attitudes towards the common practice of 6 months of locum. This was considered a good way to get to know the potential surgical trainee in a working situation. However, none of the interviewed surgeons could describe on what specific grounds selection was done.

Synthesis, Construction of a Trainee Interview Guide

The findings from the survey and interviews resulted in the identification of 11 problem domains with associated warning signs (Table 2). The problem domains and warning signs formed the basis for the development of an assessment instrument in the form of an interview guide applicable to candidates during selection (Table 3). The interview guide's questions are organized by using positive or neutral phrasing in contrast to the negatively loaded descriptions of the problem domains. The questions are organized according to traditional areas of competence while probing attitude scales, i.e., "timidity" vs "self-assurance", "lack of empathy, instrumentalization of patient" vs "understanding others, empathy", "inappropriate priorities" vs "dedication/motivation". The interview questions were organized in a purposeful and holistic manner for maximal coverage of warning signs.

DISCUSSION

A majority of the experienced surgeons participating in the study had come across surgical trainees whom they found unsuited for the surgical profession. A majority believed that signs of unsuitability are possible to detect in connection with recruitment or early in surgical training. Qualitative analysis identified 11 problem domains directly linked to unsuitability as they cause harm directly to patients or to the wider work environment (Table 2). Associated with each domain, a set of warning signs were extracted from the empirical material. Warning signs can either be direct manifestations of unsuitable actions, or indicators that unsuitable actions can be expected. These unsuitable actions are potential threats to patient safety and work environment if not corrected. Some of the signs were thought to be linked to inherent personality traits and therefore probably more resistant to change, whilst some were seen as correctable, but necessitating early detection – hence the emphasis on warning signs. The interviews revealed barriers to detecting warning signs in the current trainee system leading to potentially unsuitable candidates slipping through.

The warning signs of behaviours considered most difficult but important to change were related to: indecisiveness, lack of self-awareness and overconfidence, anti-authority attitude with inability to take instructions, inadequate problem-solving capacity, dishonesty, and not taking responsibility for errors. Personality traits and characteristics influence on behaviour patterns and hence make them more or less easy to adapt to the set standards, but cannot be accepted as an excuse for maintaining unsafe behaviour.[37] Whether a "surgical personality" or personality traits associated with the "Big Five" (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) used in psychology exists, is debated.[38-40] If one's personality is something innate or can be developed through training, self-perceived psychological turning points, and environmental exposure is also an on-going debate.[41] Either way, the warning signs play a crucial role in remedial activities.[27-29,31] Personality profiling would allow the employer to judge if a person has the potential to fit a trainee position and a future professional role avoiding those with hazardous traits, similar to business and HROs.[20,22,42]

Concerning the described warning signs of indecisiveness, inability to meet job demands, inappropriate priorities and timidity, these could be related to insecurity. Thus for these problems, supervision, mentoring, and coaching could be used in a formative training process.[30] In contrast, warning signs pointing to overconfidence, macho and anti-authority attitudes, inability to receive criticism, take instructions, and lack of self-knowledge, are considered hazardous traits, and considered useful to test for to prevent aviation accidents or incidents. A study of 364 orthopaedic surgeons found that hazardous traits like machismo, self-confidence, impulsivity and antiauthority above a specified level considered dangerous for pilots existed in 38 % of the cohort.[43] Macho attitudes have been associated with readmission and reoperation rates for the individual surgeon,[42] and positively associated with a tendency to choose operative treatment over other treatment modalities.[44] The identified problem domains and behaviours resemble the hazardous traits in the well-known "dirty dozen" in the airline industries.[45] "The dirty dozen", and the problem domains and warning signs in Table 2, reflect common human error conditions that act as precursors to negative effects on safety and the working environment. The results from the present investigation

TABLE 2. List of Problem Domains and Observed Behaviour Likely to Result in Unsuitability with a Future Professional Role as a Surgeon if not Detected and Acted upon Early

Problem Domain	Warning Signs Indicators or Observed Behaviour
1. Indecisiveness	■ Long procedural time (even simple tasks) ■ Slow procedural progression ■ Inability to work unsupervised ■ Nervousness about tasks ■ Poses questions for reassurance rather than information
2. Timidity	■ Reluctance to operate ■ Small numbers of total and independent performed procedures compared to peers ■ Inability to give criticism
3. Lack of self-awareness and overconfidence	■ Making decisions or performing procedures beyond one's competence ■ Expressed desire to undertake procedures beyond achieved competence ■ Underestimation of complexity of given procedure (situation awareness or hubris) ■ Avoids seeking advice or asking for help
4. Inability to receive criticism and take instructions	■ Inappropriate response to feedback ■ Anti-authority attitude ■ Repeating actions that instruction or feedback have sought to correct
5. Lack of appropriate communication	■ Disliked by nurses or other categories of personnel ■ Addresses different personnel categories in unjustifiably different manners ■ Deficient documentation in medical journal ■ Patient complaints about insufficient information or inappropriate tone ■ Disliked by nurses or other categories of personnel
6. Lack of empathy, instrumentalization of the patient	■ Disliked by or conflicts with nurses ■ Inappropriate communication with patients, leading to patient complaints ■ Expressed desire to try new procedures on patients to gain experience ■ Advocates surgical procedures without making a holistic judgement about what is best for patient
7. Inability to meet the demands of the job	■ Not completing assignments ■ Lack of physical and mental well-being ■ Sloppy, unstructured and unengaged work ■ Colleagues or nurses having to "mop up" after the individual
8. Inability to gain sufficient level of craft proficiency	■ Slow/deficient technical progression ■ Reluctance amongst consultants to let the trainee operate independently ■ Careless tissue handling
9. Insufficient cognitive abilities (problem solving, identification, finding)	■ Difficulties sorting and prioritizing independently (stress management) ■ Difficulties identifying differential diagnoses ■ Incomplete patient history or medical records (cognitive or negligence) ■ Not understanding or being able to discuss the wider picture of a clinical problem
10. Dishonesty	■ Not sharing or denying experiences of complications ■ Not taking responsibility for errors ■ Claiming complications are patient related ■ Nurse complaints
11. Inappropriate priorities	■ Lack of insight into work demands ■ Exhibits more concern with social status of the professional role than the content of the role

and previous studies, support that action should be taken early to clarify that certain types of behaviour are unacceptable, and if continued, this may prohibit trainees from pursuing a career in surgery.[28]

Survey respondents and interviewees mentioned the need for a surgeon to have adequate visuospatial skills. It has been shown in some studies that visuospatial perception correlates with the learning curve in laparoscopic technique and a recent study found that 2% were statistically worse than their peers: However, the results are inconsistent, and no reliable test exists to predict future performance.[4,17,21] Possibly, difficulties with technical aspects or visuospatial skills may be manifested as reluctance to operate or a divergent learning curve compared to peers. Hence documentation of a trainee's progression over time is crucial.[11,30] To overcome insufficient technical skills, mentoring, and formative assessment is needed, with a possibility

TABLE 3. Interview Guide Trainees.Letters in Heading and Brackets Show the Theme the Questions are Probing. A Positive Description that Contrasts to the Negative Description of Problem Domains, is Used to be in Line with Traditional Known Areas of Competence. Motivation (M), Empathy (E), Communication (Cm), Self-assurance and Flexibility (SF), Attention (A), Leadership (L), Lifelong Learning (LL), Cooperation and Teamwork (Co) and Problem Solving (PS)

Question
INTRODUCTION
1. Why do you want to become a surgeon? Your goal? (M)
2. What makes you feel good at work? (SF)
3. What makes you feel bad at work? (SF)
4. What are you good at? What are your weaknesses? (SF)
5. What is the biggest failure you have experienced in your job? (SF)
Understanding others (E)
6. Can you describe how you act when you first meet a patient? What is the most important thing about that situation? (E)
7. What are the 3 most important sources you base your diagnosing upon? (PS)
8. How do you act when you feel you do not know how to proceed in treating a patient? (E)
9. If you have to give a negative message to a patient, how do you handle it? (Cm)
10. If your patient questions your assessment, how do you handle it? (SF)
Communication skills (Cm)
11. How do you ensure that important information you have about a patient reaches the right people?
12. How do you feel about supervising others? How do you give criticism? Give examples (C)
13. If you receive criticism from a colleague, how do you handle it? (SF)
Self-awareness/assurance? (SF)
14. Can you give an example of a situation where you quickly had to make a decisive decision in your job? How did you proceed? (SF)
15. Have you been involved in an adverse event? Describe. What happened? How did you handle it? What did you learn from it? (SF)
16. Can you give an example of a situation where you changed a contemplated action because of advice or recommendation from someone else? What happened / what was the consequence? [When do you get help from others?] (SF)
Attention (A)
17. How do you handle situations where you have many tasks at once, for example in an emergency situation where you are forced to leave the emergency room or ward for a few hours to go to surgery? (A) What do you do when you come back? (A)
Leadership (L)
18. Can you give examples of when and how you tried to exert influence over a situation? (L)
19. Have you had a formal or informal leadership role during your professional or student time? How did you get these roles? How are you as a leader? How is it expressed? (L)
Lifelong Learning (LL)
20. What do you think is the most important thing for maintaining skills in the role of surgeon? (LL)
Cooperation and teamwork (Co)
21. How would you describe the team that a surgeon is part of, the roles and responsibilities of these persons? (other specialists, nurses, patients) Provide examples from reception, emergency or surgery (may not be possible through all 3?) (Co) Focus on 2 different roles to compare, for example, surgery and treatment teams before and after.
22. Have you experienced conflicts in your workplace? Can you give examples? How did you act then? (Co)
23. What is collegiality for you? (Co)
24. If you witness that any of your colleagues act incorrectly, what do you do? For example, if you are assisting during surgery (Co)
Motivation (M)
25. How important is work in your life? (M) How do you cope with working nightshifts?
26. What do you think you will be doing in 10 years? (M)

of self-understanding, i.e., to choose a different career path.

Deficient communication was emphasized as one of the most important warning signs. The assessment of the trainee's skill in this area is based on the way the trainee communicates the choice of treatment to the patient. Considering the patient as a "training object" was considered very negative behaviour but thought to be correctable through formative assessment and coaching. Judgment is closely related to the cognitive warning sign pointing to problem-solving abilities. The respondents were divided in their views concerning the potential development of the trainee in this area. Trainees exhibiting problem-solving difficulties could possibly benefit from normative training through cases with situational judgment discussions customized to the local context. Situational judgment tests have high reliability in assessing candidates for desirable nonacademic personal qualities.[22,46] The interview guide (Table 3) probes situational judgement through the experiences and behaviours of the candidate, which is in

agreement with a study that identified risk factors for failure through behavioural questions in admission interviews.[47]

Behaviour patterns and personality traits become evident during structured interviews and are more efficient and informative than *ad hoc* interviews.[7,18,22,48] Interviews allow the candidate to elaborate on aspects of previous performance and behaviour, ideas, and insight into surgical training and career pathways. Interpersonal and communication skills, maturity, interest in the field, dependability, and honesty can also be assessed.[18,31] Brothers et al. (2007) found that personal characteristics assessed during the faculty interviews and reference letters were more important predictors of success than academic achievements and United States Medical Licensing Examination.[49] References from other categories of personnel and previous employers were considered valuable. Previous studies have shown that any tendency toward negative remarks is associated with higher degrees of attrition and problematic behaviour.[19,50]

The problem domains complement and are consistent with previous literature in the field, with a best fit to the Royal Australasian College of Surgeons (RACS) acknowledgement of poor behaviour in the "Guide of Surgical competence and performance".[12] The inappropriate behaviour described by the interviewees and RACS represents extremes, but there are obviously "outliers" in professional performance in the surgical community. All interviewees agreed that dealing with trainees who seem unfit for the job is difficult and describe a cultural "unwillingness" to take action.

Considering current practice and results of selection, probing for warning signs may be performed when looking for top achievers. However, the risk that someone with warning signs not being identified cannot be excluded. The cost of failing to identify a "problem trainee" results in a bad return of investment since remediation activities are costly, resource demanding, and not always successful.[22,26,28] A rigorous selection process like the one used by the Royal College of Surgeons Ireland is not applicable to surgical clinics with local employment processes, as for example, in Sweden, due to large cost, and resources.

The use of 6-month of locum is established in Sweden, and this period can be used for structured assessment. Knowledge of warning signs facilitates detection of unsuitable behaviour as well as the legitimacy of reporting.

A minimum framework with external announcement of all positions, structured reference-taking, personality profiling, a structured interview (e.g., using the presented interview guide), together with laparoscopic assessment of all candidates is a good start to improve the selection process. This framework secures fairness and transparency for employers, colleagues, and potential surgical trainees, and is scientifically grounded and holistic. This strategy also offers the opportunity to probe for excellence as well as warning signs without adding extra costs.

Strengths and Limitations

The strength of the conducted study lies in the mixed methods design that allowed for data and method triangulation by using multiple data sources and researcher professions. One limitation of this study is that no questions were asked in the survey on how many times, and when the consultants had come across trainees that were found to be unsuited for the surgical profession. A Delphi approach would have allowed the participants to rate traits and attitudes more than once. The survey had limited space for comments, and only 1 participant enclosed an extra letter to explain more in-depth opinions.

All participants were from the same region in Sweden, and even though they had different nationalities, educational and work experience, this could affect generalization of the findings.

CONCLUSION

A majority of the experienced surgeons have met trainees they found unsuited for the surgical profession. A set of 11 problem domains with "warning signs" reflecting human error conditions or precursors to expected negative effects has been developed. On the basis of the domains and "warning signs", a comprehensive interview guide has been constructed. The interview guide aims to promote and be a component of a transparent, scientifically grounded, and unbiased selection framework.

AUTHOR CONTRIBUTIONS

Study concept and design: All authors. Acquisition of data: All authors. Analysis and interpretation: All authors. Study supervision: All authors.

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SUPPLEMENTARY INFORMATION

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.jsurg.2018.12.002.