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# Self-perceived readiness to perform at the attending level following surgical specialist training in Denmark

Rasmus Fabricius<sup>1</sup>, Martin Sillesen<sup>2</sup>, Morten Sejer Hansen<sup>3</sup> & Randi Beier-Holgersen<sup>4</sup>

## ABSTRACT

**INTRODUCTION:** Great effort has been invested in improving the educational aspect of the Danish five-year national surgical residency programme. Among other initiatives, an updated logbook containing specific objectives was implemented in 2015. The effect of current and prior educational efforts has not previously been studied. In the present study, we aim to investigate the role of supervision in the national surgical residency programme and the self-perceived readiness to undertake the role of a specialist doctor in gastrointestinal surgery in a cohort of gastrointestinal surgeons graduating in 2012 and 2013.

**METHODS:** A retrospective study was conducted, and questionnaires matching the categories from the American Accreditation Council for Graduate Medical Education were distributed to all Danish surgical residents graduating from the national surgery residency programme in 2012 or 2013.

**RESULTS:** A total of 30 graduated residents (55%) responded to the Danish survey. Among those, 14 (47%) felt ready to be a specialist in surgery. A total of 25 (83%) answered that increased supervision would have increased their self-perceived competencies to serve as a surgical specialist. Self-perceived readiness was significantly associated with level of supervision during surgical training ( $p = 0.02$ ), whereas no association with operative volume could be established.

**CONCLUSIONS:** A worryingly high number of graduates did not feel ready to undertake their role as a gastrointestinal surgical specialist. Adequate supervision seems to play a crucial role in education.

**FUNDING:** none.

**TRIAL REGISTRATION:** not relevant.

Readiness to perform at the attending level following medical specialist training is pivotal for both patient safety and job satisfaction. Especially in surgery, the specialist doctor is expected to safely perform a number of complex procedures without formal supervision, and lack of adequate training constitutes a serious patient safety issue. Furthermore, self-perceived lack of competencies may negatively impact performance and increase the risk of physician burn-out.

Surgery is a craft best taught hands-on, and there should theoretically be an association between case volume and self-perceived readiness to perform at the at-

tending level. Due to high workloads and work-hour restrictions, there may, however, be inadequate training time for supervision and for formalised bedside teaching, which may, in turn, impact negatively on self-perceived competencies. In 2003, the United States (US) Accreditation Council for Graduate Medical Education (ACGME) enforced a cap on work hours in all graduate medical educational programmes. Several reasons were given for implementing this cap on work hours. Amongst these were safety issues due to fatigue, health and quality of education [1]. Another survey conducted after revision of the duty hour regulation in 2011, performed in order to improve competencies, demonstrated that first-year residents of 2012 felt less prepared in regards to patient management than the 2011 first-year residents [2].

In comparison, the Danish work hour regulations impose an even stricter cap on working hours (37 hours as opposed to 80 hours per week in the US). Although a recent study demonstrated comparable case volumes between Danish and US surgical residents [3], it remains unknown whether the Danish surgical training programmes allow for sufficient supervision and training to provide graduates with high degrees of confidence in performing at the specialist level. Our aim with this study was to investigate the role of supervision in the Danish national surgical residency programme and the self-perceived readiness to undertake the role of a specialist doctor in gastrointestinal surgery.

## METHODS

A retrospective study was conducted utilising data from Kjærsgaard et al [3]. Questionnaires matching the ACGME categories were distributed to all Danish surgical residents graduating from the national surgery residency programme in 2012 or 2013. Danish surgical graduates were queried as to the volume of cases performed in the role as primary surgeon or supervisor during their surgical residency training. Graduates were asked whether they felt ready to perform at the specialist level following completion of the surgical training programme as well as other qualitative measures (Table 1). Surgical cases relevant for inclusion were defined as major procedures and endoscopies. The term "major procedure"

## ORIGINAL ARTICLE

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 TABLE 1

Qualitative questions included in the questionnaire sent to Danish doctors graduating from the national Danish surgical residency programme. The questionnaire was distributed in Danish to the participants.

✓ Question
Do you feel that Danish surgical specialty training has given you the needed operative skills to perform at the attending level?
Did you receive adequate supervision during your specialty training?
Would increased supervision have increased your ability to perform at the attending level following surgical training?
Was sufficient time allocated for supervision during your surgical training?
Was the distribution of departments in your surgical training block adequate in order for you to receive the necessary competencies to perform at the attending level following surgical training?

 TABLE 2

Characteristics of included surgical residents.

Residents responding to questionnaire, n	30
Female responders, n	7
Male responders, n	23
Major procedures, total, n, median (IQR)	846 (651-1,007)
Endoscopies, n, median (IQR)	739 (544-1,105)

IQR = interquartile range.

was applied as in the ACGME dataset [4], including most procedures above the level of simple skin or abscess incisions, etc.

Surgical cases were registered as the total number of major procedures and endoscopies referring to the total number of procedures performed during the five-year residency training.

Surgical cases where the surgeon assisted the primary surgeon were excluded from the survey.

All data involving the surgical volumes achieved by Danish surgical residents represent secondary use of previously published data [3].

### Primary outcome

Does the self-perceived impression of sufficient supervision result in a self-perceived feeling of readiness?

### Secondary outcomes

1) Does the self-perceived impression of insufficient supervision result in a self-perceived feeling of unreadiness?

2) Is the number of major procedures and endoscopies performed associated with a self-perceived feeling of readiness?

### Statistics

Quantile-quantile plots and the Shapiro-Wilk's test were

applied to test for normality of data. Using the Mann-Whitney U test, continuous outcome measures were compared between responders who felt ready or not ready to perform at the attending level following surgical training, whereas dichotomous variables were compared using the chi-squared test.  $p$ -values  $< 0.05$  were considered statistically significant.

Data are reported as medians with interquartile ranges (IQR).

*Trial registration:* not relevant.

### RESULTS

A total of 55 surgical residents received the questionnaire, and 30 residents (55%) responded. The median total number of major procedures achieved during surgical training was 846 (651-1,007) in addition to 739 (544-1,105) endoscopic procedures. There was an uneven gender distribution in the responsive residents with 77% men and 23% women; **Table 2** summarises the basic characteristics of the included residents.

After ending their five-year surgical specialty-training programme, 47% ( $n = 14$ ) of Danish surgical graduates felt ready to serve as a specialist in surgery. However, 57% ( $n = 17$ ) of the responders felt that they had not received adequate supervision during their specialist training.

A total of 80% ( $n = 24$ ) indicated that increased supervision would have increased their self-perceived competencies to serve as a surgical specialist; and 77% ( $n = 23$ ) of the responders were satisfied with the distribution and rotation in different hospitals and departments.

The quantitative (operative case volume) and qualitative questionnaire measures for graduates feeling ready to perform at the attending level versus not feeling ready are summarised in **Table 3**.

No difference with respect to operative case volumes could be identified between groups for total major cases (980 versus 688,  $p = 0.60$ ), total endoscopies (715 versus 762,  $p = 1.00$ ), total laparoscopic procedures (194 versus 173,  $p = 1.00$ ) or total open procedures (466 versus 333,  $p = 0.17$ ).

In terms of qualitative measures, self-perceived readiness to perform at the attending level was significantly associated with supervision during training ( $p = 0.02$ ). Between those feeling ready or not ready to perform at the attending level, no difference could be identified in terms of whether more supervision would have increased readiness, whether the distribution of departments during training was adequate or whether sufficient time for supervision was allocated during training.

### DISCUSSION

In this study, we found that an alarmingly high number

of graduates from the Danish national surgical training programmes did not feel adequately prepared to perform at the attending level following completion of the five-year training programme, and that a significantly higher number of the residents who felt unready to perform at the attending level reported a feeling of insufficient supervision. Furthermore, it is interesting to note that graduates who felt ready to perform at the attending level had accomplished vastly different numbers of surgical cases during training (IQR: 652-1,007), which brings into question the consistency and comparability of the different programmes available within the Danish national training programme.

The Danish national surgical training programme varies in location, but is standardised as three and a half years at the main hospital over 2-3 periods, one year at a different hospital, and six months at a highly specialised hospital. To pass the five-year training programme, a logbook (case-based, 360° or by Reznick et al table [5]) with description of objectives/procedures must be approved [6].

Supervision of resident trainees is not formalised in the Danish national surgical training programme, and it is not described to which extent the individual surgical departments choose to manage it. A possible variation between departments could be an underlying reason why 57% of responders felt they did not receive adequate supervision and 83% answered that more supervision would have been beneficial to their self-perceived competencies. However, the present data do not allow us to determine whether an improvement in supervision would have resulted in an increased feeling of readiness of the residents in question.

We furthermore observed a significant difference in self-perceived readiness to perform at the attending level and level of supervision received during training, but no association between case volumes and self-perceived readiness. Even though we found no significant associations between the number of conducted procedures and the graduates' feeling of readiness to become specialists in surgery, the idea that a surgeon will be more confident after more repetitions as compared to fewer is not far-fetched. Moreover, the small sample size in our study potentiates the risk of type 2 errors, and a possible confirmation of this hypothesis thus requires a considerably larger sample size.

Finally, the demography as well as size of department may influence the total number of procedures conducted. A way to map this variation could be through a central procedure database under the Danish Health Authority. Here, the surgeons could log procedures in open surgery, laparoscopic surgery and endoscopy as seen in the US. This would enable a better overview of volume availability in the different departments. Besides volume, such a registry could also demonstrate the availability of endoscopy, hernia surgery, laparoscopy or open surgery, which can vary from one department of surgery to the next in Denmark. For the residents, it would also be a unique way to compare numbers of surgical procedures as well as a log of their progress. Moreover, it could improve the possibility for the departments to reveal shortcomings as well as aide the residents in keeping track. Unfortunately, such a registry does not exist.

Unfortunately, the pressure from financial demands on departments to perform within budgets character-



TABLE 3

	Felt ready		Did not feel ready		p-value
	n, median (IQR)	agree, %	n, median (IQR)	agree, %	
<i>Quantitative measures</i>					
Total major procedures <sup>a</sup>	980 (652-1,007)	–	688 (430-998)	–	0.60
Total major endoscopies	715 (530-1,085)	–	762 (552-1,012)	–	1.00
Total open procedures <sup>b</sup>	466 (357-549)	–	333 (229-414)	–	0.17
Total laparoscopic procedures	194 (167-342)	–	273 (156-338)	–	1.00
<i>Qualitative measures</i>					
Did specialist training provide for adequate supervision?	–	83	–	17	0.02
Would increased supervision have increased your readiness to perform at the attending level following training?	–	83	–	100	1.00
Was sufficient time allocated to training and supervision during your specialist training?	–	33	–	77	0.29
Was the distribution of departments you rotated through during training adequate?	–	100	–	67	0.44

Quantitative and qualitative differences between graduates feeling ready or not ready to perform at the attending level following surgical training.

ACGME = Accreditation Council for Graduate Medical Education; IQR = interquartile range.

a) Includes all major procedures as defined by the ACGME dataset in gastrointestinal surgery as well as other relevant specialties: thoracic, urology, etc.

b) Includes open and laparoscopic procedures, respectively, as defined by the ACGME dataset within the realm of gastrointestinal surgery.

ised by minimum expenses does not offer much of a chance for either group or individual feedback by senior colleagues. Ideally, sufficient feedback, either face-to-face or in writing, would prove very useful and should be something to strive for.

Although we found no statistically significant difference in the number of conducted procedures when comparing the level of self-perceived readiness, our results indicate that the level of supervision does play an important role in the quality of surgical training.

Our study has a number of limitations. Firstly, the sample size is limited, and there is a potential risk that the 20 non-responders all felt ready and/or believed they had received sufficient supervision. We did not include the missing data in our statistical analyses; however, even if the 20 non-responders all felt ready, 15 out of 50 (30%) residents did not feel ready to undertake the role of a gastrointestinal specialist in surgery after the five-year training programme. Consequently, at best, 30% of the residents did not feel ready; a number that we find is alarmingly high. To further investigate the large inter-individual variation in self-perceived readiness, we recommend that future studies aim to include a higher number of participants. Furthermore, implementation of qualitative elements such as in-depth interviews of the participants may provide information that cannot be obtained by a "regular" questionnaire

Secondly, we had no information regarding the specific location of the individual training, i.e. at which hospitals and departments the residents were trained. An analysis including the specific location would allow for identification of specific hospitals and departments with sufficient or insufficient supervision.

Lastly, our study discloses only self-perceived readiness. We do not know how the graduates' self-perception correlates with their feeling of readiness; as their self-perception may be influenced by other factors than their current competencies as surgeons, such as level of self-esteem or comparison to others. Inclusion of personality tests, psychological tests and interviews could shed light on this issue.

## CONCLUSIONS

A total of 47% of the residents did not feel ready to perform as a gastrointestinal surgical specialist after completing the five-year Danish national surgical training programme. This number is alarmingly high, and supervision seems to play an important role in determining the graduates' readiness. To our knowledge, this study is the first to examine surgical residents' self-perceived readiness, including supervision and surgical volume as explanatory variables. Future studies are needed to better understand and heighten the quality of this crucial area of education.

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