Systematic Review of Postgraduate Surgical Education in the Last Two Decades

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Systematic Review of Postgraduate Surgical Education in the Last Two Decades

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Abstract

Introduction:
Surgery is a complex educational subject that comprises knowledge, skills and attitudes. We aimed to find out whether surgical educational research matched the complexity of surgery and to establish the sources, topics and main findings of surgical educational research.

Methods:
We performed a systematic review of surgical education in the literature. We searched Embase, Medline and PsycInfo between 1991 and 2009 using the following terms: (postgraduate) AND (resident or registrar or house officer) AND (education or training) AND Surgery. We limited our search to articles in the English language.

Results:
The initial search resulted in 67 papers. After excluding duplicates and irrelevant papers, we included 38 papers. The vast majority of papers were produced in USA (n=34, 89%) and in university departments (n=32, 84%). The papers fell into the following categories: evaluation (n=28, 74%), interventions and evaluation (n=7, 18%) and others (n=3, 8%). The most common themes were restriction of working hours (n=10, 26%), simulation (n=4, 11%) and ethics (n=3, 8%). Only two papers tackled interventions other than simulation to improve operative skills.

Conclusions:
Surgical educational research in the last two decades was occupied with evaluation of existing methods of training and education rather than interventions to improve training. It was distracted by external factors that affect training rather than focused on internal factors. Surgeons must be innovative educationalists in order to face challenges of surgical training and education. Research in postgraduate surgical education is suboptimal.

Introduction

Surgery is a complex subject. Competence in surgery requires acquisition of appropriate skills, knowledge and attitudes. Clinical competence and technical facility are the hallmarks of a successful surgical education (Wade). However, other elements, such as management, scholarship, teaching, communication, professionalism and team working are equally important. Unlike other specialties, surgery requires high and complex technical skills. With the complexity of surgery, we expected to find a wealth of literature in surgical education especially in skills education, training and assessment and in the impartation and acquisition of surgical knowledge and attitudes. To assert that, we performed a systematic review of surgical education over the last two decades.

Search results:
The final search produced 67 articles. After electronic and manual de-duplication, we included 38 articles in this review. The number of articles compares favourably with other specialties when the same search strategy is applied. Despite that, the number of articles is very small taking the complexity of surgery into account. We presented the results of similar searches in other subjects in Table 1. The search strategy and results are summarised in the diagram 1. Countries, institutions and specialties Thirty-four papers came from US institutions (89%).
Three papers came from European institutions. One paper only came from Asia. Thirty-two papers (84%) came from University departments while only six came from non-university departments. Most papers were based in the context of general surgery (as a specialty) (n=18, 47%) or surgery in general (n=9, 24%). Table 2 summarises the specialties involved.

Interventions and evaluations:
Twenty-eight papers evaluated existing educational topics and methods and their effect on training outcomes. Seven Papers introduced educational interventions and evaluated the effect of the interventions on trainees. All showed improvement as a result of the intervention. The interventions were based on simulation (n=3), structured reading programme and PBL discussion groups (n=1) and interactive teaching episodes (n=1). Two papers studied interventions (other than simulation) to improve operative skills. The first intervention was reducing the number of trainees in one residency programme. The second intervention was allocating trainees lacking in certain skills to units with no trainees but with large volume of relevant cases where skill training could be provided. Both interventions led to improvement in operative experience.

Topics and findings:
Ten papers were written around the theme of working hour restriction, four papers were written about use of simulation and six papers were about special education topics, of which three were about ethics education. The widely used (and compulsory) work based assessments and self-assessments were the topic of one paper each.

Simulation:
Three papers introduced interventions based on simulation and evaluated performance pre- and post-intervention. One paper only evaluated trainees’ skills. All papers found simulation to be beneficial in improving skills and knowledge.

Restriction of working hours:
Four papers surveyed trainees +/-trainers. The main findings were - restriction of working hours reduce operative experience but improve educational experience. - Restriction of working hours improves quality of surgeons’ lives. - Longer working hours might compromise patient care. Four papers reviewed logbooks of trainees before and after working hours’ restrictions. The results were surprising. Three papers found either no difference or improvement in operative experience after restricting working hours. One paper found decreased number of operations performed by trainees in specific roles and in certain years after restricting working hours.

Ethics:
Three papers dealt with the issue of ethics education in surgery. One was a survey, another was a literature review and the third one introduced a learning programme and evaluated its effects. They concluded that ethics education in surgery is suboptimal despite its importance. Educational programmes in ethics improve outcomes.

Discussion

Internal and external pressures challenge education and training in surgery. There is an extensive campaign by governments and insurance companies to reduce costs, increase efficiency and improve outcomes1. On the other hand, there is an increasing pressure to improve public accountability of surgeons[2,3] and to demonstrate objectively the ability of surgeons and institutions[4,5]. While the workloads of general surgeons have been increasing6 and while working hours have been decreasing[7,8], the pressures on general surgery are mounted further. Subspecialisation and hyper-specialisation increase the pressure on surgeons to refine their knowledge in very specific areas while at the same time they are still required to have general knowledge to be able to deal with general surgical emergencies (at least)9. The different roles of surgeons require them to balance their activities continuously. They need to train while at the same time being trained in new technology[3]. They need to maintain existing knowledge while being up-to-date with evidence based knowledge. They need to manage, lead and communicate effectively[10,11]. They have to be business minded while they are patient focused. They need to manifest that they are good value for money in times of economic downturn and spending cuts. Apart from all the above, they also need to create the right balance between work and life. It is best to tackle the above-mentioned pressures by interventions to improve surgical education and training (in all its elements) and by high quality research into education and training of surgeons. Such intervention and research are bound to provide surgeons with the appropriate tools to face the above-mentioned pressures proactively and effectively while improving their provision of high quality care of patients and training of the next generations of surgeons.

Conclusion(s)

Surgical educational research in the last two decades
was occupied with evaluation of existing methods of training rather than interventions to improve training. It was distracted by external factors that affect training (like restriction of working hours) rather than focusing on internal factors. There is an urgent need to initiate research to tackle the improvement of acquisition of surgical skills in the current environment of restricted resources and working hours. The importance of scholarship in surgical practice and integrating scholarship into training programmes and the busy schedules of surgeons are of utmost importance and must be the topic of extensive research. Surgeons must be innovative educationalists in order to face challenges of surgical training and education. Research in postgraduate surgical education over the last two decades is suboptimal.

Limitations

We performed a narrow literature search over a long period. The search strategy did not include secondary or manual searching. We have not searched conferences’ abstracts and proceedings. Whilst our search strategy has led to very few excluded studies, it might have led to a low yield in terms of number of studies.

References

Illustrations

Illustration 1

Table 1 and Table 2

Table 1:
Results of similar search in other subjects between January 1991 and May 2010.

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
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</tr>
<tr>
<td>Medicine</td>
<td>76</td>
</tr>
<tr>
<td>obstetrics or gynaecology or gynecology</td>
<td>12</td>
</tr>
<tr>
<td>paediatrics or pediatrics</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 2:
Papers according to specialties involved

<table>
<thead>
<tr>
<th>Speciality</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>General surgery</td>
<td>18</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>3</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>6</td>
</tr>
<tr>
<td>Plastic surgery</td>
<td>1</td>
</tr>
<tr>
<td>Urology</td>
<td>1</td>
</tr>
<tr>
<td>Surgery in general</td>
<td>9</td>
</tr>
</tbody>
</table>
Illustration 2

Diagram 1 - article search

Diagram 1

**Search strategy:**
- Search terms: Surgery AND postgraduate AND (Education or training) AND (resident or registrar or (house and officer))
- Terms in title or abstract
- Period: 1991-2009
- English Language only

67 papers

Electronic De-duplication

43 papers

Review of abstracts

- 38 papers included
- 5 papers excluded:
  - 3 duplicates
  - 2 not relevant to postgraduate research
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