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Review Article

Do postgraduate research degrees contribute to positive outcomes for surgical doctors? An evaluation of relevant literature

Matthew F. Flynn*

University College London, 74 Huntley St, Gower St, London WC1E 6BT, UK

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***Correspondence:**
Dr. Matthew F. Flynn,
E-mail: rmhemfl@ucl.ac.uk

ABSTRACT

Doctorates as part of surgical training are gaining popularity and diversity within the global market. The costs of these degrees need weighed against anticipated benefits for the individual and healthcare systems. This review considers the drivers, impact and future of higher research degrees in surgery.

Keywords: Postgraduate, Doctorate, Training, Research, Global

INTRODUCTION

HOW HAS POSTGRADUATE SURGICAL EDUCATION CHANGED, ATTRIBUTES OF A POSTGRADUATE STUDENT

In the last 10 years, postgraduate surgical education has changed considerably, including an increase in trainees pursuing postgraduate research. Mandatory requirements for completion of surgical training or CCT (the pre-requisite for full qualification as a consultant) include three peer-reviewed publications and three presentations to "learned societies".[1] In addition, the completion of an additional master's degree, MD or PhD is now considered desirable, even essential to be competitive in many specialist fields.[2,3] Questions have been raised over the fitness-for-purpose of these criteria: Thomas et al reported in 2015 that three publications were only met in 88% of CCT submissions, and concerns grow over poor quality clinical publications, which nevertheless are increasingly being used as academic currency.[4,5] This has led to the Royal college of surgeons placing "greater emphasis on participation in clinical research, rather than simply the publication of papers" and prioritisation of research modules in a move towards a competence-based approach.[6] However, from personal experience of otolaryngology selection, this process accredits and may even require levels of publication higher than those required to in fact graduate from the programme.[7]

Which are the attributes which we are aiming to develop? From those essential to study medicine outlined by the medical schools council, consensus among Scottish general surgeons identified 5 themes desirable for a surgeon trainer in addition to his clinical skills: organisational skills, professional behaviour, communication skills, and professional development.[8,9] Lastly noted were "personal qualities and interpersonal skills" currently enjoying considerable focus under the interrelated and overlapping fields of human factors, non-technical skills and leadership competencies.[10] It is already easy to match these themes with doctoral study.

IMPACT OF HIGHER DEGREE TEACHING, LEARNING AND ASSESSMENT ON HIGH QUALITY LEARNING

The essential dimension of a higher research degree is that a 'student-researcher' completes a body of work that moves a field forward, developing as an independent authority in her own right. This progression from undergraduate learning, from content delivery to where

research skills are sought and learned by the candidate is often a major transition. Master's degrees combine taught elements with a 'dissertation project,' an essay in the craft of independent research, within which expectations of independence and supervision may vary greatly.[11] Within medicine the doctor of medicine (MD) degree is considered roughly equivalent to the PhD. It is only undertaken after several years of clinical practice and considered an "advised" degree, distinct to the "supervised" PhD where supervision is more structured.[12] These academic learning transitions reflect the surgeons' professional qualifications being taken across postgraduate training. The membership of the Royal college of surgeons (MRCS) examinations taken at the beginning of surgical training and the exiting Fellowship (FRCS) both have a syllabus blueprinted to core clinical knowledge; the FRCS however uses the viva voce format for its final assessment, with a focus on areas of expert opinion and niche knowledge, not dissimilar to the viva of a PhD.[13] This ascends Miller's pyramid from the "knows how" of clinical reasoning (often assessed by single best answer questions) to "does" of a clinicians ability to synthesise baseline knowledge, scientific advances, patient expectations and more.[14] Thus, the presentation skills and evidence synthesis skills gained over a higher degree find ready application in concomitant professional assessments.

Doctoral degrees conducted by surgeons in training are in many ways a type of the 'professional doctorate' or 'modern doctorate' increasingly undertaken by mature students, on a part time basis, or with 'non-traditional' thesis. These doctorates may be aimed at preparing for or changing professional practice and other enterprises.[15] In each academic setting culturally challenging student-supervisor interfaces carry own learning demands: student perspectives of being on the backfoot in the unspoken literacy around authority, assertiveness, support systems and cultural stereotypes were found to predominate in one survey of postgraduates across a variety of disciplines.[16] This culture is nevertheless important. Student researchers are need this immersion their higher education and/or research world, and do not miss out on the benefits of participating in a small committed expert team by being 'seen to be from elsewhere' as may happen for doctors. A survey of professional doctorate supervisors tellingly ranked this 'enculturation' as the lowest priority compared to other factors such as critical thinking or transferrable skills.[17] Meanwhile in hospitals, both physician and surgical trainees are sensing erosion of the older style "firm" clinical system (where a consultant is assisted by and supervises a consistent small team of trainees each at various stages) in favour of a broader 'hospital specialty team.'[18] But this is not an advocacy of teamwork for its own competence-ticking sake; high quality learning occurs through transformative social processes of "negotiated identity" which best arise amid the behaviour, beliefs and leadership of a research team.[19] Thus may a surgeon-scientist cultivate their own sense of clinical excellence from prior experience in centres of research excellence.

Nevertheless, it remains controversial whether the research undertaken in these degrees effectively can be obtained alongside the considerable time taken to master necessary operative skills with increasing demands of service provision and heavy weighting on quantifiable outputs of the research.[20,21]

PITFALLS AND WIDER OPPORTUNITIES OF COMPLETING A HIGHER DEGREE

While it is easy to demonstrate that higher degrees are worthwhile in and of themselves, they are read within a lattice of practical and personal circumstances. Not least the financial: training costs of £3,360 to meet essential criteria and 5,564 for desirable criteria are required to enter higher surgical training, and only a small proportion is tax-deductible.[22] By the end of surgical training 68% of trainees will have completed a higher degree at a further cost of £18,009.[23] The wider psychological and relational impact of this persistent financial pressure has yet to be objectively measured. Beyond this, the temporary atrophy of surgical skills, training momentum and salary need to be significantly outweighed against the extra time, skills and knowledge gained.[24]

But as with the pitfalls of higher degrees, the potential opportunities offered may be just as latent. The ability to obtain independent funding is the hallmark of an independent researcher, and frequency of funding awarded after surgical training was significantly higher in those who had postdoctoral research experience.[25] Only 4 out of 17 Australian surgical departments were described as "research active" and just 5 "research resourced." [26] A similar evaluation of colorectal surgery in Europe found that level 1 and 2 evidence only comprised 3% and 5% respectively of all research activity carried out in these units.[27] Of course these limitations may reflect contractual restraints and the utility of more observational studies to clinical practice, but as it stands there is little prevailing research impact at consultant level, and judicious pursuit of higher degrees may be a solution to this. In practice the adage "Do research from a job, not for a job" belies the reality that much research is needed to obtain a consultant position, but new appointees may be less motivated to continue it as a purely extra-curricular activity.

For all their expense, higher degrees do offer a degree of external support and accountability for research. Nearly all junior surgical doctors are "active in research," however in one survey 50% of all projects are left unfinished when not associated with a higher degree, with the two main reasons being overcommitment (which could also to be interpreted as lack of ringfenced time for research from service provision and training) and lack of senior guidance and support.[28]

THE STUDENT EXPERIENCE, PERSPECTIVES FROM AROUND THE GLOBE

The perspective of early years surgical doctors is also important. One UK-wide audit addressing whether early surgical training programmes found that only four out of 960 early years surgical training posts had sufficient training opportunities built-in, and burnout has elsewhere been sampled at 61% in this group.[29,30] It could be argued that early-years trainees are not best placed to take on the additional demands of research. Already proven solutions to get junior trainees involved more sustainably in research include such nationwide audit "collaboratives," and registries to generate 'big data' sets which can be subsequently analysed for RCT's, observational data and cases such as the Swedish angiography and angioplasty registry (SCAAR).[31]

Emphasis on academic achievement may cost a trainee more than money. In America, the highest ranked factors in an individuals' career selection among MD graduates were 1. the ability to balance work and the rest of life and 2. opportunities for patient care: each equally important as all other considerations combined. It is interesting to note however that these two priorities were deemed considerably less important for MD-PhD and MD-Research Intensive degrees.[32]

Similarly in Ireland, surgeons reported the oldest age at full qualification (36.7) years of all medical specialties, with a noticeable higher percentage (92.3%) having completed a higher research degree compared to the next highest (75.0%).[33] The impact on life out with surgery in the form of only achieving a long-term job later in life may be considerable.

NEW MODELS BASED UPON THE UK EXPERIENCE

The rapid changes affecting surgical training will be reflected in new models of the surgical research. There is a need for novel minimally invasive techniques and robotic surgery to be piloted by the new trainees who will use them in future, offering manifold proposals for 'modern doctorates.'[34] Another area for focus is the embedding of randomisation into daily clinical practice; randomised 'quality improvement' projects that can enable clinicians to collect data on change interventions such as management and technology as well as the basic sciences.[35] Establishment of trainee research collaboratives has been a successful tool which allows students to research by committee, crowdfunding materials, and ensuring co-authorship of larger studies.[36]

New models of planning out higher degrees have been suggested such as subdividing theses into smaller sections which each can be published separately and individually contributing toward the quota of required publications.[37]

CONCLUSION

On personal reflection of trying to meet these requirements and demonstrate so many diverging and sometimes even contradictory competencies, each and all new models should encourage trainee surgeons to know their own limits and setting appropriate boundaries to allow for their own personal time and interests and allowing research interests to arise naturally from these. It would be counterproductive to develop the most attribute-balanced clinicians over a necropolis of each individuals financial and personal sustainability.

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