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MEDICAL EDUCATION

The changing clinical experience of British medical students

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The UK National Health Service is undergoing fundamental reforms, which might have a detrimental effect on the training of doctors, not least with respect to the amount of clinical experience that medical students get.

We compared the practical experience gained by two cohorts of students at medical schools throughout the UK, who had started their training in 1981 or 1986. The assessment was made by questionnaire at the end of their final clinical year. Experience of acute medical conditions, surgical operations, and practical procedures differed significantly between groups of medical schools, and showed a significant decline in the past five years.

This decline in the clinical experience of medical students has coincided with the introduction of the health service reforms. We suspect that the university-based clinical education designed for a lifetime of change is in danger of being replaced by a dispersed clinical apprenticeship for current practice.

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Introduction

Medical training in the UK takes about 5 years of study and entails lectures, tutorials, and experience with patients on wards. Surprisingly, very little is known about how much clinical experience medical students get during this training. The introduction of a service increment for teaching and research as a substantial component of teaching hospitals' budgets[1] should act as an incentive for accurate assessment of the clinical experience of students in the future. But there is concern that this experience might have been reduced already due to continuing changes in the National Health Service. Reduced length of stay by patients and ward closures[2] have resulted in fewer opportunities for student learning. Additionally, teachers have an increased clinical workload and fewer teaching resources. London's hospitals and medical schools might be especially vulnerable, since they are relatively old institutions and are concentrated in the inner-city area. Indeed, radical proposals for their reform have been made.[3,4]

Here we compare the clinical experience of two cohorts of medical students, 5 years apart. In addition, we compare the experience of students studying in London with those studying elsewhere in the UK.

Methods

A questionnaire was sent to two cohorts of final-year medical students in any UK medical school who, as one of their five permitted choices of university, had applied to St Mary's Hospital Medical School, London, to start the course in October, 1981,[5] or October, 1986.[6] The questionnaire was sent about four months before the end of the students' final year—ie, in 1986 or 1991 (or 1987 and 1992 for students who had intercalated a BSc degree). Reminders were sent after five and ten weeks. Students answered many questions and, in particular, indicated their experience of acute medical conditions (which were subsequently scored as 1, never; 2, once; 3, more than once), surgical operations (1, never; 2, once; 3, 2–4 times; 4, more than 4 times), and practical procedures (1, never seen; 2, seen; 3, done with supervision; 4, done alone).

Statistical analysis was by analysis of variance (ANOVA), with t tests and one-way ANOVA for specific comparisons, and Scheffé's test for a posteriori comparisons. The cohorts were compared by the Mann-Whitney U test. The medical students were also divided into four groups: those who studied in London; those in Scotland and Northern Ireland; those at Oxford and Cambridge; and those at medical schools elsewhere in England and Wales. The experience of the four groups was compared, and that of the London students was compared with the experience of students from elsewhere in England and Wales (including Oxford and Cambridge).

TABLE I—STUDENTS' (%) EXPERIENCE OF ACUTE MEDICAL CONDITIONS

Acute medical conditions	1986 (1981) cohort: Never seen	Seen once	Seen > once	p*
Myocardial infarction	2 (1)	3 (3)	95 (96)	NS
Cerebrovascular accident	4	7	89	..
Drug overdose†	3 (20)	10 (20)	87 (60)	..
Acute left ventricular failure	4 (3)	9 (6)	87 (92)	NS
Lobar pneumonia	9 (5)	16 (15)	76 (80)	NS
Acute upper GIT bleeding	13 (11)	16 (16)	71 (74)	NS
Meningitis	13 (13)	26 (21)	61 (66)	NS
Pneumothorax	16 (14)	23 (38)	62 (49)	<0·01
Acute psychosis	19 (23)	20 (24)	62 (53)	<0·05
Respiratory failure	22	20	59	..
Diabetic ketoacidosis	19 (18)	31 (24)	50 (58)	NS
Febrile convulsion	26	26	49	..
Hypoglycaemia	31 (26)	25 (28)	45 (46)	NS
Status asthmaticus	35 (18)	23 (21)	42 (61)	<0·001
Acute renal failure	34	27	39	..
Acute hepatic failure	34	31	35	..
Subarachnoid haemorrhage	45 (31)	31 (30)	24 (39)	<0·001
Status epilepticus	54 (40)	25 (31)	21 (29)	<0·001
Hypothermia	55 (34)	31 (30)	14 (37)	<0·001
Acute glaucoma	76 (85)	17 (12)	7 (4)	<0·001

*Simple significance level without adjustment for multiple significance testing. Since tables I, II, and III together report 47 significance tests then a Bonferroni procedure would consider as only significant at $p < 0·05$ only those items nominally significant with $p < 0·001$.
†Aspirin overdose specified in 1981 cohort.

TABLE II—STUDENTS'(%) EXPERIENCE OF SURGICAL OPERATIONS

Surgical operations	1986 (1981) cohort: Never seen	Seen once	Seen 2–4 times	Seen > 4 times	p*
Herniorrhaphy	5 (3)	6 (3)	20 (22)	70 (73)	NS
Caesarean section	4 (1)	5 (3)	27 (17)	64 (80)	<0·001
Large bowel resection	4 (2)	4 (5)	36 (28)	55 (65)	<0·05
Cholecystectomy	7 (2)	9 (8)	33 (29)	52 (61)	<0·01
Appendicectomy	6 (2)	9 (5)	34 (30)	51 (64)	<0·001
Arterial surgery	12 (16)	13 (16)	33 (30)	42 (38)	NS
Transurethral prostatectomy	22 (24)	17 (11)	22 (32)	39 (34)	NS
Mastectomy	26 (17)	13 (14)	30 (32)	31 (37)	<0·01
Thyroidectomy	26 (22)	21 (25)	34 (38)	19 (16)	NS
Gastrectomy or V&P	26 (14)	23 (22)	35 (43)	16 (22)	<0·001
Internal fixation of fracture	31 (40)	23 (23)	33 (26)	12 (11)	<0·05
Amputation	36 (25)	26 (33)	30 (31)	9 (11)	<0·05
Cataract extraction	41 (38)	23 (21)	27 (26)	8 (16)	NS
Skin grafting	41 (33)	26 (19)	26 (33)	7 (15)	<0·001
Cardiopulmonary bypass	49 (41)	32 (31)	16 (21)	3 (7)	<0·01
Mastoidectomy	78 (78)	14 (15)	7 (5)	2 (1)	NS
Removal of cerebral tumour	77 (76)	18 (17)	5 (6)	1 (1)	NS
Laryngectomy	82 (85)	14 (11)	4 (3)	1 (1)	NS

V&P = vagotomy and pyloroplasty.
*See footnote to table I.

Results

Questionnaires were sent to 463 students who applied for entry to St Mary's in 1981 (1981 cohort) and 761 students in the 1986 cohort. Replies were received from 302 (65%) and 389 (51%) students, respectively. 44% of the 1981 respondents and 48% of the 1986 respondents were female. 444 of the 691 respondents studied in London, 24 at Oxford or Cambridge, 182 elsewhere in England and Wales, and 41 in Scotland and Northern Ireland. Some students did not complete all sections of the questionnaire.

Students' experience of acute medical conditions varied to the extent that some disorders (eg, myocardial infarction, cerebrovascular accident, and drug overdose) were seen more than once by most students, whereas others (eg, acute renal failure, acute hepatic failure, and subarachnoid haemorrhage) were not seen at all by a third or more of the students (table I). Students' experience varied both between the four groups of schools ($p < 0·001$, ANOVA) and between the 1981 and 1986 cohorts ($p < 0·001$, ANOVA):

School/cohort	*Mean (SD) score, no*
Oxford and Cambridge	34·5 (3·7), 24
England and Wales	32·7 (4·8), 180
London	31·5 (4·9), 442
Scotland and Northern Ireland	29·7 (5·2), 41
1981	32·6 (4·8), 301
1986	31·3 (5·0), 386

Overall mean (SD) for experience of medical conditions was 31·8 (4·9) (95% range 21–40, range 17–42, theoretical range 14–42). Significant a posteriori comparisons using Scheffé's test ($p < 0·05$): Oxford and Cambridge with Scotland and Northern Ireland, Oxford and Cambridge with London, England and Wales with Scotland and Northern Ireland.

Likewise, students showed extensive differences in experience of surgical operations (table II) and practical

TABLE III—STUDENTS' (%) EXPERIENCE OF PRACTICAL PROCEDURES

Practical procedures	1986 (1981) cohort				
	Never seen	Seen	Super-vised	Done alone	p*
Venepuncture	1	2	1	97	..
Rectal examination	0	5	30	65	..
Urine testing	4 (2)	9 (8)	11 (3)	76 (86)	<0·01
Setting up an intravenous drip	0 (0)	10 (0)	27 (7)	63 (93)	<0·001
Electrocardiography	0 (0)	14 (5)	21 (8)	65 (88)	<0·001
Arterial puncture	2 (1)	15 (12)	21 (16)	63 (71)	<0·05
Vaginal exam with speculum	1	3	64	32	..
Suturing in casualty	4 (1)	18 (8)	21 (12)	57 (79)	<0·001
Bladder catheterisation (M)	2 (0)	16 (11)	37 (25)	45 (65)	<0·001
Biochemical exam of urine	14	17	10	60	..
Intramuscular injection	1	23	30	46	..
Bladder catheterisation (F)	6	31	34	29	..
Subcutaneous injection	2	39	25	34	..
Endotracheal intubation	2 (3)	28 (11)	62 (70)	9 (16)	<0·001
External cardiac massage	7 (3)	33 (29)	47 (44)	13 (25)	<0·001
Ring block	19	46	13	23	..
Repair of episiotomy	4	62	22	12	..
Microscopic exam of urine	42	30	17	12	..
Lumbar puncture	4 (4)	72 (61)	18 (24)	6 (12)	<0·001
Pleural fluid aspiration†	16 (8)	62 (58)	18 (19)	3 (14)	..
Sigmoidoscopy	3 (1)	79 (78)	15 (20)	2 (1)	NS
Ventricular defibrillation	11 (4)	71 (77)	17 (14)	1 (5)	<0·05
Abdominal paracentesis†	41 (8)	48 (58)	9 (19)	2 (14)	..
Colonoscopy	7 (16)	88 (82)	5 (2)	1 (0)	<0·001
Insertion of CVP line	8 (8)	88 (84)	4 (8)	0 (0)	NS
Gastroscopy	6 (4)	90 (92)	4 (4)	1 (1)	NS
Bone marrow aspiration	48 (36)	50 (57)	1 (5)	1 (3)	<0·001
Liver biopsy‡	47 (30)	52 (67)	1 (3)	1 (1)	..
Renal biopsy‡	72 (30)	28 (67)	0 (3)	3 (1)	..

*See footnote to table I.
†1981 cohort was asked about "pleural fluid aspiration or abdominal paracentesis" as a single item.
‡1981 cohort was asked about "liver biopsy or kidney biopsy" as a single item.
Exam = examination.

procedures (table III). Overall, mean (SD) score was 45·2 (7·2) (95% range 29–60, range 22–64, theoretical range 18–72) for surgical operations and 41·1 (4·4) (32–49, 22–56, 15–60) for the 15 practical procedures the two cohorts had in common.

For surgical procedures, ANOVA showed significant differences between cohorts ($p < 0·001$) and between groups of schools ($p < 0·005$):

School/cohort	*Mean (SD) score, no*
Oxford and Cambridge	48·9 (8·1), 24
England and Wales	46·0 (7·0), 180
London	44·9 (7·0), 443
Scotland and Northern Ireland	42·9 (8·3), 40
1981	46·3 (6·8), 300
1986	44·3 (7·5), 387

Significant a posteriori comparison using Scheffé's test ($p < 0·05$): Oxford and Cambridge with Scotland and Northern Ireland.

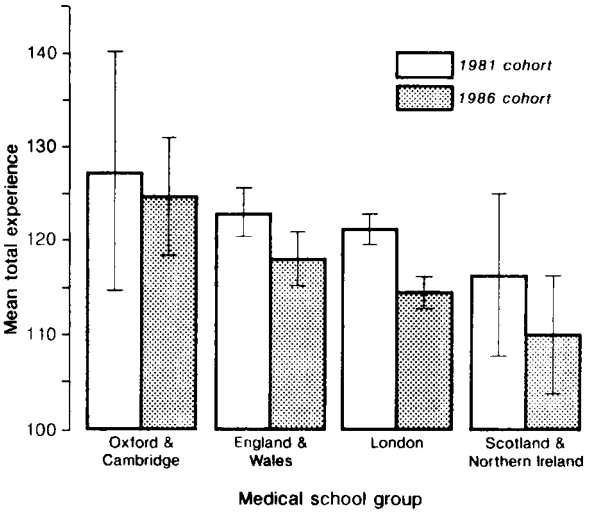
For practical procedures ANOVA revealed significant differences between cohorts ($p < 0·001$) but not between groups of schools:

School/cohort	*Mean (SD) score, no*
Oxford and Cambridge	42·6 (4·9), 24
England and Wales	41·3 (4·8), 180
London	41·1 (4·1), 441
Scotland and Northern Ireland	39·7 (4·8), 41
1981	42·6 (3·7), 302
1986	39·9 (4·5), 384

No significant a posteriori differences using Scheffé's test ($p < 0·05$).

There were no significant differences between the clinical experiences of male and female students.

ANOVA of a total experience score of students in England and Wales (the sum of the three summary scores, theoretical range 47–174) showed significant differences between the 1981 and 1986 cohorts ($p < 0·001$; 1986 cohort: mean 115·6, SD 14·0, n 285; 1981 cohort: mean 121·6, SD 11·7, 357), and between London and non-London schools ($p < 0·02$), although the interaction of school and cohort was not significant ($p = 0·38$). Mean scores (SD, n) in London decreased from 121·1 (11·2, 202) in the 1981 cohort to 114·5 (13·3, 238) in the 1986 cohort, compared with a change in scores in non-London schools from 123·5 (12·0, 83) in the 1981 cohort to 118·8 (14·5, 119) in the 1986 cohort (figure). The 1986 non-London cohort scored lower than the 1981 non-London cohort on acute medical conditions ($p < 0·05$), practical procedures ($p < 0·001$), and total score ($p < 0·05$); the 1986 London cohort scored lower than the 1981 London cohort on acute medical conditions ($p < 0·005$), surgical operations ($p < 0·001$), practical procedures ($p < 0·001$), and total score ($p < 0·001$).



Mean index of students' total experience with 95% CI.

The survey included students from all 9 London medical schools (mean n 49; SD 29; range 17–117). Summary measures showed no significant differences between the schools for acute medical conditions, practical procedures, or total score, although differences were significant for experience of operations ($p < 0·001$). Significant interactions between cohort and London school for surgical operations ($p < 0·01$), practical procedures ($p < 0·001$), and total score ($p < 0·001$) show that changes in experience differed between schools.

Discussion

The method of collecting data in this study could be used for regular audit of medical education. A high response rate could be obtained by coupling the audit with provisional medical registration, especially if questionnaire completion secured remission of part of the registration fee.

The clinical experience of medical students has declined during the last five years, with a larger, albeit not significantly different, decline in London. Some of the changes can be readily explained—eg, decreased experience of hypothermia probably reflects recent mild winters in the UK; the decline in gastrectomy probably results from the use of H_2-blocking agents, and more internal fixation is probably due to a change in practice. The students' increased experience of acute psychosis may reflect changing inner city populations or longer student attachments to psychiatric firms, and more experience of

pneumothorax may result from *Pneumocystis carinii* infection in patients with AIDS.

Surgical experience differs between London schools, which might be because of local shortages of suitable patients for teaching. An overall reduction in surgical experience might arise from a deliberate policy, which may be appropriate for a subject that is becoming more specialised and (perhaps more suitably) postgraduate. On the other hand, the parallel, unwelcome reduction in familiarity with practical procedures suggests that the decrease in experience of students was unplanned. There was no indication that the reduction in practical experience was because students were instead receiving more training and supervision.

Attention has been focused on London, which contains 29% of UK medical students and 25% of the population. The lesser clinical experience at schools in Scotland and Northern Ireland, compared with those in England and Wales, may be explained by the smaller population available to its students (20% of UK medical students and 10% of the population).

The general decrease in experience of medical students that we report here, coupled with moves toward a less factual and less detailed curriculum, makes imperative a radical improvement in the much criticised pre-registration year as the final phase of basic medical education.[11] The recommendation of the British General Medical Council—a core course with options—is likely to yield doctors with less comprehensive clinical knowledge and experience than doctors practicing today. Conversely, they should be better able to reason, enquire, and learn from their experience, provided that they have adequate postgraduate training with closer supervision.

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BOOKSHELF

There is Nothing More I Can Do

An Introduction to the Ethics of Palliative Care. David Jeffrey. Penzance: Patten Press. 1993. Pp 96. £5.95. ISBN 1-872229115.

Patients expect that doctors who care for them will do no harm. Many also assume that on graduation from medical school doctors take the Hippocratic oath. A further assumption is that all doctors possess faultless insight. If a doctor is accused of being less than honest with a patient or, more specifically, of not disclosing prognosis, he is often said to be denying patient autonomy. Yet the real difficulty may be that he is just lacking in insight. Doctors' and patients' agendas frequently differ. Medical tradition still holds that the doctor knows best and that the patient must be protected if not from reality then at least from facts. This protection is sometimes provided without efforts to establish the patient's real wishes. The teaching of communication skills is now part of the undergraduate medical curriculum. Does this emphasis reflect a modern interpretation of the notion of "a good bedside manner" or is it a return to medical paternalism? Our aim must be a more ethical and equitable partnership of care with our patients.

Quality of life has become a catch phrase in the management of cancer. If it can be measured and to some extent maintained, then much can be justified. It has been thought of as a measure of the difference at any particular time between an individual's expectations and experiences. With increasing competition for limited resources, discussion of treatment options with a patient or relative may turn into a cost-benefit analysis. Palliative care has been defined as the active total care of patients whose disease is no longer responsive to curative treatment. Listening to patients and controlling their physical, psychological, social, and spiritual symptoms are the cornerstones of modern palliative care. If curative and palliative treatment could be given in parallel, the ethical dilemmas of transition from one to the other would be less problematical. Why the dichotomy between curative and palliative? There are many conditions, for instance diabetes mellitus, where the treatment is always palliative.

Advance directives or living wills are favoured by some and feared by many. David Jeffrey argues that the presence of a living will may be of some help in influencing a doctor's decisions, but says that to resort to such a device in palliative care is a sad reflection on the quality of the doctor-patient relationship. Dislike of advance directives or living wills seems to conflict with the notion of patient autonomy. Patient autonomy in the face of vulnerability, advancing disease, and impending death is a curious phenomenon. Are vulnerability and autonomy mutually exclusive? Advance directives might allow patients a more objective opportunity at a less vulnerable time. In the USA the 1991 Self-Determination Act requires that all patients be informed on admission to hospital of their right to refuse treatment and to make an advance directive. Thin partitions may divide