Beyond 'clinical'?: four-dimensional medical education

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Summary

Medical education is in crisis. Undergraduates experience an excessive burden of information, develop attitudes to learning that are based on passive acquisition of knowledge than on curiosity and exploration, and suffer from progressive disenchantment with medicine[1]. There is also a serious problem of providing adequate clinical experience for medical students at existing teaching sites, largely because of reduction in bed numbers, increased patient throughput and clinical specialization[2]. This problem was identified over a decade ago in London[3] but has not been solved by the merger of medical schools. A recent survey in one London teaching hospital showed underemployment of students and limited patient contact[4]. A review of clinical clerkships in an Australian medical school revealed that one-third of teachers were perceived as unconcerned, discouraging, derogatory or hostile, and only one-half were rated as effective educators[5]. One consequence has been the development of a wide-ranging debate on changing medical education[6-9]. Traditionalists have diminishing room for manoeuvre in defence of existing educational practices, as cautious bodies like the General Medical Council (GMC) opt for fundamental reform[1].

Introduction

Graduates face problems that include escalating health care costs, growing public dissatisfaction with doctors individually and the profession as a whole, imbalance between the use of high-technology medicine and early care, inequity of access to needed services, wide variations in the quantity and quality of medical care, protection of the environment, ensuring greater participation by services users, influencing change in 'lifestyle', and the need to ensure effectiveness and efficiency in medical practice. Medical schools are divorced from the health needs of the communities, often have poor links with local services and produce graduates with limited skills[10].

Educational methods used in hospital-based medicine favour a traditional inductive reasoning approach following fact acquisition, even when pattern recognition and hypothesis testing are more usual modes of clinical practice[11]. The dysfunctional effect of current curricula on learning has been sufficient for one medical teacher to publish a handbook on overcoming learning difficulties in medicine[12]. Critical thinking and problem-solving abilities, desirable outcomes from any tertiary education process, have received inadequate attention and recognition.

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Solutions

A solution that is now favoured is that of shifting a significant part of medical education into community settings, primarily general practice. Clinical teaching in the community has been advocated for some time in the UK and implemented in innovative schools in many other countries[13]. Despite objections that the quality of general practice is too uneven and the academic base too small to allow significant basic medical education to occur in the community, a consensus is developing that identifies general practice as a prime site for undergraduate medical education[14].

Education in the community offers the student opportunities to:

(1) Study health, disease and disability in their natural context, avoiding a reductionist model of medicine and appreciating the uncertainty at the centre of clinical practice[15].

(2) Observe the relationships between the organic, psychological and social dimensions of health, sickness and diseases, and develop an elaborating style of learning that correlates well with knowledge retention and high examination performance[16].

(3) Follow individuals from primary care through hospital care, and out again in a process of individual but guided study that appears to promote later academic and research interests[17].

(4) Integrate epidemiology, pathophysiology and therapeutics through a problem-solving approach to casework, a method tested at McMaster and Newcastle NSW[18], and found to produce graduates with better analytic and communication skills[19].

(5) Improve communication and patient-education skills by treating them as specific techniques to be learned[20], an approach that has been shown to improve history taking, examination technique and accuracy of diagnosis[21].

(6) Contribute significantly to the clinical care of patients, particularly those with chronic diseases[22].

(7) Contribute to the medical school and local NHS's understanding of local health problems through work around issues identified as important by local community organizations[23,24].

Equally important is the potential within a community-based undergraduate curriculum to develop a population perspective that could influence all medical school activities. The population perspective has recently been defined as

> the capacity to appreciate the determinants, ranges and variations of health status and disease in the entire community[10].

Awareness of health needs in the community, the distribution of health and disease within it, as well as the utilization of different components of the health service are all crucial to developing a balanced curriculum. Students should recognize that the patients seen in hospital with arthritis or heart disease, for example, only represent the minority of people in the community with these conditions. Identifying inaccessibility of services and inequities in their provision or acceptability with help chart the priorities for health services research in the area. Exposing inequalities and disease incidence and prevalence may suggest hypotheses concerning aetiology and mechanisms, thus stimulating basic science research[25].

Problems

Objections to the large-scale transfer of undergraduate education into general practice must be taken seriously, since they are well founded[26]. There are significant shortages of both resources and skills in all departments of general practice and primary health care[27]. Existing teaching in general practice may be sub-optimal. A recent study of student experience in London teaching practices suggested that students wanted more experience in history taking and examination, more use of home visiting as a teaching resource and more contact with well-briefed primary care team members[28]. Similarly, Lloyd and Rosenthal have shown that general practice teachers are better at conveying communication skills and the psychosocial aspects of medicine than at teaching basic clinical skills and knowledge[19]. Problem-solving approaches widely used in teaching in general practice may themselves be insufficient to equip undergraduates with 'inquiry' skills[30], although this can be overcome[10]. Development of a comprehensive problem-solving, multi-disciplinary approach to teaching larger numbers of students over longer periods of time will require extra teacher-time and better prepared teachers. These issues are argued forcefully by Metcalfe[31,32] and touched upon in the General Medical Council's discussion document[1] and in the King's Fund study[14], but their implications have yet to be pursued. Although much experience in inducting medical teachers has been gained in postgraduate training for general practice, some of which may be transferable to undergraduate teaching[33], the rapid development of a cohort of new teachers may require approaches pioneered in public health medicine[34].

In view of the changing nature of the health service, medical education also needs to be reformed to reflect the changes occurring in society and within health care. Future medical graduates require experience of working in teams, making decisions collectively, liaising with a range of service agencies, managing resources, assessing needs, implementing solutions and assessing outcomes. Whilst education in general practice offers undergraduates the opportunity to learn problem-solving approaches to multi-dimensional problems, few practices will be appropriate models for teaching teamwork, resource management, needs assessment and audit. In addition, education in general practice is likely to be effective in imparting basic skills like consultation techniques but poor in teaching management methods in developing or contentious areas of medicine. For example, general practitioners and their teams are known to be confused about health promotion about cholesterol and diet[35], sometimes reluctant to undertake opportunistic health education about HIV infection[36], poor in managing diabetes in ethnic minority populations[37], and likely to avoid management of substance abuse[38]. These deficiencies are not due to lack of technical expertise in specialist fields, but more fundamental biases in the skills, attitudes and knowledge that need to be imparted to medical students. There is some evidence that, where community-based undergraduate education operates, only part of the range of primary care workload is used as an educational resource[39].

With the active promotion of general practice budget-holding, it is possible that students will have a very different learning experience depending on the type of practice with which they are attached; and how open the practice is in discussing issues like which patients to take on to the practice list, or whether a two-tier health service is in the making. They may also learn that certain activities are performed routinely despite the fact that there is limited evidence for their effectiveness.

Whilst existing networks of teaching practices supporting current undergraduate programmes and postgraduate traineeships may well be able to overcome these biases, the scale of effort needed to absorb a significant proportion of the undergraduate curriculum into the community will require wide recruitment of general practitioners into teaching. It is unlikely that this group of general practitioners will have the necessary range of skills needed for sustained and systematic undergraduate education, and so their prior training must be a precondition for the wholesale extension of undergraduate education into the community.

An alternative model

These educational resource and skill shortages in general practice will need to be considered in any plan for curriculum innovation. We propose a different model of community medical education to those advocated elsewhere[1,13,31,32], drawing some educational resources from outside medicine whilst also expanding departments of general practice[32] and reorganizing medical school faculties as advocated by the GMC[1].

We postulate that there are four dimensions to a more appropriate medical education: the acquisition of clinical skills and knowledge; a social, psychological and anthropological understanding of health and illness; a population perspective; and an understanding of how services respond to needs.

Structuring a series of teaching, service and research experiences using such dimensions to explore health problems such as HIV/AIDS, mental health, disability or cardiovascular disease, would provide an opportunity to bring together the clinical, population, service and psychosocial perspectives to key public health and clinical issues, whilst retaining the individual patient as the starting point of all teaching. A wide range of other health conditions would provide a suitable focal point for such learning activities: diabetes, chronic obstructive airways disease, lung cancer, dental caries, breast cancer, sexually transmitted diseases, injuries, and many others would all open the way to discussing the four dimensions described above.

Figure 1 indicates the range of teaching experiences that could be incorporated into the training around one of these problems, HIV disease. The nature of HIV

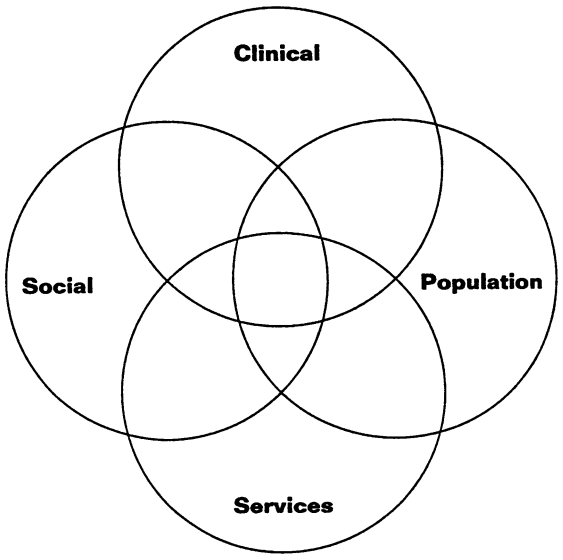

Figure 1. Dimensions of medical education

disease in its presymptomatic phase, the counselling, diagnosis, prophylactic care and monitoring of HIV-infected patients are all important components of the clinical skills and knowledge. Furthermore, the clinical evolution of the conditions and the varied presentation of symptomatic disease, the treatment options available, and the prognosis all form part of what medical students usually learn. They may not, however, focus attention on the skills required to take a sexual history or to discuss the anxieties and concerns of the patient. There is evidence that even doctors trained in communication methods and sexual history taking can fail systematically to elicit basic information like sexual orientation[40].

The epidemiological aspects of HIV disease are equally important. Students need to learn about the hazards associated with different types of risk activity, the evidence for the link between sexually transmitted diseases and HIV infection, and the relative risks of transmission from infected male to uninfected female, and *vice versa*. They need to appreciate the rationale for unlinked anonymous testing and the value and limitations of sentinel site surveillance, such as in genitourinary medicine clinical attenders.

HIV disease also exemplifies the importance of appreciating the range of services available at primary care, community and hospital level. Home-based care is an important element of comprehensively meeting the needs of patients with HIV disease, and recognizing the essential role of voluntary organizations and local authorities in meeting this need introduces the student to the problems of coordinating different responses to need. Appreciating the role of genito-urinary medicine, services for people with drug problems and counselling services is integral to understanding how a range of different services, together, may help in developing an appropriate health service response to this condition. The limited contribution made by general practice[36] can be experienced, analysed and understood; this may help, in time, to enhancing the general practitioner's role in caring for people with HIV disease.

The psychosocial elements are similarly integral. Issues of counselling, confidentiality, human rights, informed consent, clinical trial procedures and many others have arisen in response to HIV disease. Lack of appreciation of these will ensure that care is neither sensitive nor comprehensive. A failure to appreciate the central importance of peer-led health promotion in preventing the further transmission of HIV may mislead students into over-estimating the impact of traditional service-led health education. Students can be helped to appreciate how they, as individual service providers, respond to different patient groups, such as drug users. Dealing with well-informed patient groups in some cases, and marginalized and stigmatized groups in others, may also open the students' eyes to the importance of how the condition is perceived in determining access and utilization of health care services. Appreciation of the more profound structural changes which may be necessary to combat high risk situations[41] is similarly important in developing a comprehensive understanding of HIV disease in its medical and social context.

Figure 2 makes the point that this approach would not expect students to have detailed knowledge of all these different dimensions. What is expected, however, is to have an integrated knowledge of the key concepts within all dimensions and to the sources of more complex insights.

The student needs to gain a thorough understanding of all the elements that appear in the overlap of three or four dimensions; the overlap between any two dimensions is valuable but not essential, and the bulk of knowledge in any one dimension is 'nice to know' but clearly not a prerequisite for the effective provision of care.

Implications

Since the components of each dimension come from different sources and sites of teaching and experience, and the objective of the programme is to place the student in the centre of the overlap, teaching faculties would need re-orientation. The function of the teaching faculty would be to organize the students' experience, sometimes individually but more often in small groups, rather than to provide it all, and faculty funding could reflect the need to purchase educational resources from a wide variety of outside bodies.

This approach to community education would achieve a number of objectives:

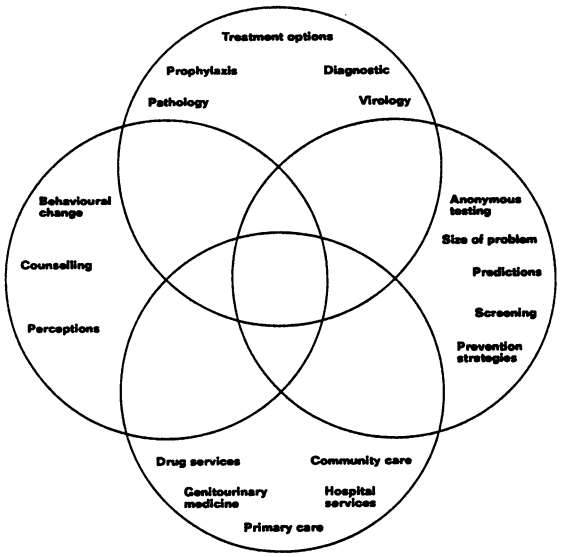

Figure 2. Integrated knowledge of key concepts and overlaps in learning about HIV disease

(1) Students would learn from a wide range of health and other professionals, whose own teaching methods and skills could be drawn into undergraduate medical education.

(2) Learning would occur in more usual contexts: the home, the health centre; the social services department; the public health department; the patient advocacy group; the community organization.

(3) Problems of poor teaching by untrained teachers would not be transferred from hospital settings to general practice. Instead teaching sites and resources in the community would be identified and encouraged to contribute to medical education. Contracts may need to be negotiated with such sites and organizations, ensuring some transfer of resources in exchange for their teaching function. Medical schools may make useful contributions to the funding of voluntary sector self-help groups that could have an important impact on health care and may assist in the evaluation and development of their activities.

(4) Ownership of medical education would spread out beyond medical schools to include interested parties in the wider community, with the potential for better communication about the broader range of issues that affect health status, health care, and social wellbeing.

(5) Faculty re-organization would be facilitated. For example, departments of epidemiology and public health medicine may be in the best position of all departments to help increase the number of teaching sites by liaising with the district health authority, and governmental and non-governmental organizations operating locally, as well as developing a population perspective within community-based clinical teaching. To do so, however, they would require to develop their expertise and employ additional staff members to facilitate such activities.

Evaluating effectiveness

New approaches to teaching medicine need evaluation, and ideally the model that we propose should be tested in a limited number of sites, with careful auditing of process and outcomes. In our view, no new approaches to student assessment are needed. Basic clinical skills and knowledge can be assessed throughout the clinical course using objective structured clinical examinations (OSCEs) [42], which can also be used to measure psychiatric history taking skills[43]. Communication techniques can be assessed using videoed role play that is now conventional in general practice teaching, and improvements during training detected[44]. Structured short answer questions (SSAs) can be effective tests of problem-solving abilities, and are suitable for testing both clinical and public health knowledge[45]. The performance of students on an innovative course of the kind we have described can be measured throughout their teaching and compared with student performance on more conventional courses; a prospective study of this kind should be built into any planned curriculum change.

Conclusion

The Turnberry conference[10] identified five main recommendations:

(1) *Goals and objectives:* each medical school should develop and publicize a 'mission statement' of goals and objectives that defines its commitment to both individuals and populations . . .

(2) *Faculty development:* each medical school should establish methods to ensure that each faculty member understands the distribution of health problems in the population served.

(3) *Education:* each medical school should establish methods to ensure that each graduate has acquired knowledge, skills and attitudes that reflect appropriate applications of patient-physician, biomedical and population based perspectives.

(4) *Educational resources:* each medical school should assemble an adequate breadth of resources (faculty and facilities) to ensure that all students have a balanced experience with the full range of health problems in the population served, and have opportunities to work with other health professionals and agencies.

(5) *Health intelligence:* each medical school should establish a unit or links with an organization capable of transforming raw 'data' bearing on health and health services into usable 'information'. In turn, this 'information' needs to be interpreted, in social, political, and other contexts, as 'intelligence' to guide the faculty and Dean in establishing institutional priorities for education, research and service . . .

In essence this approach argues that teaching should focus on individuals and groups in their context, the local community; that medical schools should take responsibility for defined populations and try to respond to their needs; that community resources should be seen as educational resources for medical training; and that a population perspective should pervade the teaching, research and service aspects of medical school activity.

We advocate a multi-disciplinary approach to undergraduate education, based on the Turnberry proposals and utilizing the purchaser-provider model with re-organized faculties as purchasers of educational experience and techniques from a wide range of professional and lay sources. This approach could attain a range of important and long-overdue objectives in the reform of medical education without overloading the existing general practice teaching network and without further undermining the acquisition of clinical skills.

The four-dimensional model could be developed initially around a particular set of health issues (HIV disease is only one example) without requiring a complete overhaul of the medical curriculum (which although desirable is unlikely). If such a pilot project were successful in mobilizing teaching resources in the community, then other health issues could be added, thus transforming the curriculum and the faculties that provide it.

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