An outcomes research perspective on medical education: the predominance of trainee assessment and satisfaction

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Context A fundamental premise of medical education is that faculty should educate trainees, that is, students and residents, to provide high quality patient care. Yet, there is little research on the effect of medical education on patient outcomes.

Objective A content analysis of leading medical education journals was performed to determine the primary foci of medical education research, using a three-dimensional outcomes research framework based on the paradigm of health services outcomes research.

Data sources All articles in three medical education journals (*Academic Medicine*, *Medical Education*, and *Teaching and Learning in Medicine*) from 1996 to 1998 were reviewed. Papers presented at the Research in Medical Education conference at the Association of American Medical Colleges annual meeting during the same period, and published as *Academic Medicine* supplements, were also analysed.

Study selection Only data-driven articles were selected for analysis; thus editorials and abstracts were excluded.

Data extraction Each article was categorized according to primary participant (i.e. trainee, faculty, provider and patient), outcome (performance, satisfaction, professionalism and cost), and level of analysis (geographic, system, institution and individual(s)).

Data synthesis A total of 599 articles were analysed. Trainees were the most frequent participants studied (68·9%), followed by faculty (19·4%), providers (8·1%) and patients (3·5%). Performance was the most common outcome measured (49·4%), followed by satisfaction (34·1%). Cost was the focus of only 2·3% of articles and patient outcomes accounted for only 0·7% of articles.

Conclusions Medical education research is dominated by assessment of trainee performance followed by trainee satisfaction. Leading journals in medical education contain little information concerning the cost and products of medical education, that is, provider performance and patient outcomes. The study of these medical education outcomes represents an important challenge to medical education researchers.

Keywords Costs and cost analysis; delivery of healthcare; education, medical, *trends; literature review (pt); patient satisfaction; practice guidelines; professional competence, *standards; research design.

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Outcomes research has received growing attention during the past decade, in large part because of steadily increasing health care costs and wide variations in the level and use of medical resources across geographic regions. Other factors which account for the increase in outcomes research include the limited effectiveness of certain medical practices in improving the health of the population, and the increased competition in health care which has induced health care purchasers to pressure providers to demonstrate the quality and cost-effectiveness of their health care product. In 1989 the United States Congress established the Agency for Health Care Policy and Research (AHPCR) with a mandate to produce practice guidelines.[1] AHPCR has invested over 100 million dollars in outcomes research since then. In response to these and other developments, virtually all specialty societies have developed practice guidelines for their members. In an editorial in the *New England Journal of Medicine* in 1988, Relman emphasized the need to understand the successes and failures of health care and described the outcomes movement as the era of 'assessment and accountability'.[2] Although some have questioned the outcomes of

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Key learning points

Content analysis of 599 articles published in three leading medical education journals from 1996 to 1998, using a three-dimensional conceptual framework borrowed from health services outcomes research, namely: participants, outcomes and levels of analysis.

Participants were classified into four groups: trainees, faculty, providers, and patients. Outcomes were analysed according to four categories: performance, satisfaction, professionalism and cost. Levels of analysis were: individuals, institutions, systems, and geographic areas.

Trainee performance and satisfaction were the predominant themes of medical education research (60%), whereas cost and patient outcomes were the foci of roughly 5% of articles.

An important mission of medical education is to educate trainees to provide excellent patient care, yet there is little research published in leading medical education journals on the effect of medical education on patient outcomes.

'outcomes research', significant efforts, funds, and attention have been expended on outcomes research and the trend is likely to continue.

Simply defined, outcomes research is intended to assess what does and does not work in the delivery of health care. The underlying reasons for successes or failures are of interest, but the critical concern is the measurable benefit and cost of a particular medical practice. Outcomes research purports to understand medical practice in terms of large-scale, objective, and systemic analyses of patient outcomes. Presumably, such analyses would allow patients and practitioners to make better-informed, cost-effective health care decisions.

Slater described outcomes research as 'any research that attempts to link either structure or process, or both, to the outcomes of medical care at the community, system, institution, or patient level'.[1] He refers to Donabedian's classic article[3] in order to define structure, process, and outcomes. In addition, Slater indicates that outcomes research may be conducted at different levels of analysis, that is, the community, system, institution or patient. The distinction in levels is important because the results at one level may not be generalizable to other levels. Also, outcome results from all levels are necessary to understand completely the effects of medical care.

A fundamental premise of medical education is that faculty should educate trainees, both students and residents, to provide high quality patient care. As students graduate from medical school and residents from training programmes, they assume the role of provider or practitioner and establish practice patterns which are learned in large part during their training. These four groups, that is, trainees, faculty, providers and patients, comprise the most visible participants in whom the effects or outcomes of medical education are likely to be manifested.

The outcomes research paradigm provides useful insights as to possible outcomes of medical education as well as possible methodologies for medical education outcomes measurement. Outcomes are the consequences or effects of medical education on trainees, faculty, providers, and patients. Outcomes research has defined four general parameters of patient outcomes, namely, clinical outcomes (e.g. morbidity, hospital length of stay), patient satisfaction, functional status or quality of life (e.g. ability of a patient to care for themselves) and cost. Based on this paradigm, four general areas of medical education outcomes can be defined: performance (e.g. scores on written or oral examination), satisfaction (e.g. ratings of wellbeing in a new curriculum), professionalism (e.g. communication, career choice), and cost (e.g. expenditures for teaching in the outpatient setting).

Outcome measurements in medical education can be made at various levels of aggregation. These levels include a geographic area (e.g. nation, state or province), system (e.g. a group of institutions or a health care system), institution (e.g. a medical school or hospital), or individuals (e.g. surgery clerkship students or paediatric interns). Distinguishing among levels of medical education outcomes is important because lessons learned at one level may not necessarily apply to other levels.

Thus, a three-dimensional framework for analysing medical education research can be built on the outcomes research paradigm, namely:

- Participants
  - Trainees
  - Faculty
  - Patients
  - Providers
- Outcomes
  - Performance
  - Satisfaction
  - Professionalism
  - Cost

- Level of analysis
  - Geographic
  - System
  - Institution
  - Individual(s)

There are four outcomes which are typically measured in health care outcomes research: clinical outcomes, patient satisfaction, functional status or quality of life, and cost. Each has received substantial attention and in fact, the complete assessment of a given medical practice in terms of outcomes research requires data or information from each category. In contrast, in medical education research, there appears to be a significant amount of research on trainee performance and relatively little attention paid to the cost of medical education or the effect of medical education on patient outcomes. In order to investigate this hypothesis, a content analysis of the studies published in leading medical education journals was performed, to determine the primary focus of research in medical education using a three-dimensional outcomes research framework.

Methods

Four data sources were used. All the articles published from 1996 through 1998 in the following three journals, dedicated to medical education, were analysed: *Academic Medicine, Medical Education,* and *Teaching and Learning in Medicine.* In addition, all the papers presented at the Research in Medical Education (RIME) conference at the annual meeting of the Association of American Medical Colleges during the same period, and published as *Academic Medicine* supplements, were analysed. Only data-driven studies were included, thus excluding editorials, opinions, and abstracts. Each article was categorized according to the primary participant (i.e. trainee, faculty, provider or patient), outcome (i.e. performance, satisfaction, professionalism and cost for trainees, faculty, and provider, and clinical outcomes, satisfaction, quality of life or functional state, and cost for patients), and level of analysis (i.e. geographic area, system, institution and individuals). The 'methods' section of each article was most useful in categorizing each study. Often, the research outcome could best be determined by identification of the dependent variable. In some instances, when there was more than one focus or outcome reported, a forced choice was made such that no article was counted more than once. The choice was based on the main purpose of the research as stated by the authors.

Both researchers agreed on the rules for categorization and the definition of the primary participants, outcome measures, and levels of analysis. Some 44 articles were randomly selected and both authors performed categorization to assess interrater reliability. Initial review resulted in 88% concordance between authors. Subsequent review resolved most of the discrepancies in favour of the main coder (J.P.) such that final concordance between authors was 98%. Consequently, one author (J.P.) performed the categorization of all articles. The coding guidelines for categorization are shown in Table 1. Some examples are presented below to illustrate the categorization scheme.

Articles which described medical student scores on a written or oral examination, objective structured clinical examination (OSCE), or clinical ratings by faculty, were classified as *trainee* and *performance*. If the article reported United States Medical Licensing Examination (USMLE) test scores of all US students, then the level of analysis was *geographic*. If USMLE scores from multiple institutions were described (e.g. all students from five medical schools), then the level of analysis was *system*. An *institutional* analysis implied a single medical school or hospital. *Individuals* referred to a group of participants which was less than the entire medical school class (e.g. 15 first-year student volunteers).

For *trainees*, *professionalism* included topics such as ethics, morality, and career choice. *Satisfaction* referred to trainees' opinions or feelings on issues such as course or faculty, self-confidence or societal concerns such as AIDS.

For *faculty*, *performance* concerned their roles as teachers or educators. *Professionalism* referred to issues such as promotion, tenure or career choice. *Satisfaction* included faculty opinion about academic life or societal concerns.

Research which focused on physicians in practice was classified as *provider*. Research on practice patterns, such as physician ordering of screening mammography in response to a continuing medical education programme, was categorized as *provider* and *performance*. However, an article which described a change in patient outcomes, such as hospital length of stay in response to a continuing medical education programme, was classified as *patient* and *performance*. Although providers were the focus of the educational intervention, the measured outcome related to patients.

Results

A total of 599 articles from the four data sources were data-driven and examined some aspect of the medical educational environment. There were 215 articles from *Academic Medicine*, 182 from *Medical Education*, 84 from *Teaching and Learning in Medicine* and 118 from the *RIME* conference.

Table 1 Health care outcomes perspective on medical education research: coding rules

Dimension	Category	Example or description
Levels of analysis	Geographic	Nation, state, region, province
	System	More than one school or institution not defined by a geographic region
	Institution	A whole school or class of a school
	Individual	Less than a whole school or class; a sample of students
Participants and outcomes	Trainees	
	Performance	Written exam, oral exams, OSCEs
	Satisfaction	Opinions, feelings, beliefs, attitudes
	Professionalism	Ethics, morality, career choice
	Cost	Financial outcomes or implications
	Faculty	
	Performance	Role as teacher, evaluator, educator
	Satisfaction	Opinions, feelings, beliefs, attitudes
	Professionalism	Promotion, tenure, career choice
	Cost	Financial outcomes or implications
	Providers	
	Performance	Practice patterns
	Satisfaction	Opinions, feelings, beliefs, attitudes
	Professionalism	Ethics, morality, career choice
	Cost	Financial outcomes or implications
	Patients	
	Clinical outcome	Morbidity, length of stay
	Satisfaction	Patient perceptions about their health care
	Quality of life	Ability of patient to care for themselves
	Cost	Financial outcomes or implications

Table 2 Number of articles according to type of primary participant and outcome, from data-driven studies reported in three leading medical education journals from 1996 to 1998

	Participant				
Outcome	Trainee	Faculty	Provider	Patient	Total
Performance	205	68	19	4	296
Satisfaction	149	21	21	13	204
Professionalism	57	18	8	2	85
Cost	2	9	1	2	14
Total	413	116	49	21	599

Trainees were the participants most frequently studied, in 68·9% ($n = 413$) of all articles, followed by faculty at 19·4% ($n = 116$). Providers and patients accounted for 8·1% ($n = 49$) and 3·5% ($n = 21$) of articles, respectively (Table 2).

Performance was the outcome most commonly measured (49·4%; $n = 296$). Trainee, faculty and provider performance accounted for 48·7% ($n = 292$) of all articles, while clinical outcomes of patients accounted for only 0·7% ($n = 4$) of articles. Satisfaction was the primary outcome in 34·1% of articles ($n = 204$) and professionalism accounted for 13·9% ($n = 83$). Cost was the least studied outcome, in only 2·3% ($n = 14$) of articles.

Analyses were performed at the individual level in 39·2% ($n = 235$) of articles and at the institutional level in 36·7% ($n = 220$). Geographic ($n = 72$) and system ($n = 72$) levels each accounted for 12% of the articles.

Discussion

Our content analysis of three leading medical education journals showed that indeed medical education research is dominated by assessment of trainee performance (34%) followed by trainee satisfaction (25%), which together account for three-fifths of all articles. Given that a principal objective of medical education is to educate trainees, it is certainly appropriate for medical education researchers to be keenly interested in trainee performance and satisfaction. Furthermore, by definition, trainees' matriculation occurs in close proximity to educators. Therefore, they are readily available for measurement or survey. However, a fundamental goal of medical education is to educate

trainees to provide high quality patient care. In the medical literature reviewed, and as hypothesized, there was little information on either cost or provider and patient outcomes. Little information appeared on how graduates function as practitioners in terms of the type of education received. Little insight was gained as to the quality of care provided by graduates, even though considerable time and expense was spent in training them as quality practitioners. Consequently, educators and administrators looking to this body of literature for information to optimize their educational decision making will be disappointed. Leading journals in medical education contain limited information concerning the cost and products of medical education. Instead, medical education research has focused on assessment of trainee performance with the implicit assumption that satisfactory trainee performance will translate into quality patient care. Dimitroff & Davis presented a content analysis of research in undergraduate medical education from a sample of 773 journal articles from 1975 through 1994.[4] Topics related to curriculum, teaching and student assessment occurred most frequently. Similarly to our own findings, they identified only 10 articles (<2%) which related to economics and none which discussed patient outcomes and medical education.

Undoubtedly, many difficulties arise in assessing provider performance or patient outcomes to gain insights into the quality of care which graduates provide. Often, data are impossible to obtain because they are either confidential or simply not recorded, or because the practice location is unknown. There are also many confounding variables in measuring patient outcomes as they relate to individual physicians and their education. Health care outcomes research has progressed significantly during the past decade but many methodological difficulties persist. Not surprisingly, it is difficult to gain a firm understanding of the quality of care provided by graduates and this probably accounts for the fact that little research is done to link medical education to the actual delivery of health care.

The advent of health care outcomes research provides a unique opportunity to explore the link between education and practice. In some occupations, such as that of airline pilots, considerable effort and money is expended toward a high quality training experience and close monitoring of actual practitioner or job performance. Understanding practitioner performance allows educators to maintain a relevant curriculum and explore strengths and weaknesses of the educational programme from the perspective of actual outcomes in the field. In medical education, this is unquestionably a difficult and arduous process. Establishing a link between patient outcomes, provider performance, and medical education is challenging. However, this warrants a future direction for medical education research which may provide great insights into the strengths and weaknesses of our educational systems and processes.

As hypothesized, the present results show that there are few studies related to the cost of medical education. Again, such analyses are difficult and require many value judgements. Jones & Korn have provided an excellent discussion of the challenges in calculating educational costs in medicine.[5] Nonetheless, in this era of cost containment, and considering the substantial variability in student tuition among US medical schools, it seems appropriate to gain a better understanding of the costs of medical education. It is not enough for medical educators to simply state that 'education is a priority and must be supported'. A better understanding of the costs of educating physicians is essential in order to maximize efficiency and make informed decisions when educational priorities or choices must be established.

Medical education research is better balanced when it comes to levels of analysis. Almost two-thirds of research is conducted at an institutional level or higher. Approximately one-quarter of the research is performed at a multi-institutional or even national level. Multi-institutional research is essential in order to test the robustness of the effects of educational interventions across sites. What works in one site may not work in another depending on the culture and processes operating in each site. Medical education researchers have been diligent in seeking large sample sizes for research.

In conclusion, the use of a health care outcomes research framework with its participants, outcomes, and levels of analysis, was useful in assessing the types of research conducted in medical education as reported in three leading medical education journals. Trainee performance and satisfaction were dominant research topics with relatively little attention paid to the cost of medical education or the quality of care provided to patients by graduates. The study of cost and provider performance represents important challenges to medical education researchers. The fundamental mission of medical education is to educate trainees to care for patients. Accordingly, it behoves medical education researchers to evaluate more fully the effects of medical education on the entire spectrum of participants and outcomes, from trainees to patients and from performance to cost.

Contributors

JP and GB agreed on rules for categorization and the definition of the primary participants, outcome

measures, and levels of analysis. JP carried out the subsequent review and performed the categorization of all articles.

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