The current status of medical education literature in Chinese-language journals

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Abstract

Background: Many research articles on medical education have been published in Chinese-language journals, the majority within the past few years. However, there have been no objective studies to look at the quality of these, and their contribution to present day thinking.

Aim: This study explored the areas of focus, and the quality, of published research on Chinese undergraduate medical education.

Method: We searched three major Chinese databases, including Chinese Biology Medicine in electronic form, Chinese Journals Full-text Database, and Chinese Technological Periodicals Database, to trace the research themes and methodologies of Chinese-language research papers published from January 2000 to December 2008.

Results: The annual number of published articles on undergraduate medical education research has increased over time in China, with 70% of the articles in our 9-year study published in the past 4 years; the most popular theme was curriculum and teaching. Non-comparative studies accounted for the majority of the literature (84.6%); and comparative studies were rare.

Conclusions: Although an increase in the number of articles on medical education research in China is encouraging, more methodologically rigorous designs are needed to improve research quality. Generic and focused training on research methodology is essential to convert quantity into quality.

Introduction

The primary goal of medical education is to develop future doctors who can adapt to the conditions of medical practice in a rapidly changing health care environment and maximize healthcare quality (IIME Core Committee 2002; Chen et al. 2004). Knowledge has grown rapidly in the field of medicine; the profession of medicine is facing particular challenges as a result of rapid advances in biomedical sciences, information technology, and biotechnology (IIME Core Committee 2002). To meet these challenges, medical schools worldwide have undergone various medical education innovations to optimize their educational policies, curricula, teaching and learning methodologies, assessment, and organizational management. One result has been a flood of published medical education-oriented research. However, the quality of this research varies. It is expected that high-quality research findings will inform best practices and be utilized for policy decisions in education, and ultimately result in improved patient care (Bligh & Parsell 1999). This realization gave rise to “best evidence medical education (BEME)” standards (van der Vleuten et al. 2000), whose purpose is to enable “the implementation by teachers in their practice, of methods and approaches to education based on the best evidence available” (Harden et al. 1999), during when demand for evidence-based approaches and outcomes research in medical education increases (Hart & Harden 2000; Prystowsky & Bordage 2001; Chen et al. 2004; Coomarasamy & Khan 2004; Daughnecy & Wood-Daughnecy 2004). Some medical researchers predicted that the application of BEME could improve teaching methods, enhance educational and assessment levels, and provide more scientific strategies for medical education. Therefore, several systematic
reviews on a wide range of subjects in medical and healthcare education have been published in the major journals dedicated to specific questions and subjects in medical education (Irby 1995; Bowen & Irby 2002; Reeves et al. 2002; Coomarasamy et al. 2003; Hebert et al. 2003; Coomarasamy & Khan 2004) to reflect the best evidence available.

Medical education research has been carried out for about 30 years in China. One result has been a flood of research papers published in Chinese-language journals. However, there has been no objective and quantitative evaluation of the quality of these researches so far; thus, it is hard to tell to what extent these researches can be used to direct health-related policy decisions.

To explore the areas of focus for Chinese undergraduate medical education and the quality of the resulting research papers, we searched three major Chinese databases for the research themes and methodologies of the medical education-related research papers published from January 2000 to December 2008 in Chinese-language journals. This is the first study to quantitatively analyze medical education research literature in China.

Materials and methods

Search strategies

We searched three major Chinese databases, including Chinese Biology Medicine in electronic form (CBM), Chinese Journals Full-text Database (CNKI), and the Chinese Technological Periodicals Database (VIP), for articles on medical education published between January 2000 and December 2008. CBM was searched by using subject indexing such as education, medicine, and undergraduate. CNKI was searched with an approximate-matching approach, using keywords of “medical education” and “undergraduate.” VIP was searched using keywords or subjects equivalent to “medical education” and “undergraduate.” We included studies that were primary or secondary research, were conducted in mainland China, and involved undergraduate medical students. Studies on nursing education and continuing medical education were not included.

Data extraction

Two authors independently extracted data according to the inclusion criteria and exclusion criteria. Discrepancies were resolved by consensus or by consulting a third reviewer. Search outcomes were as follows:

- 2951 publications from initial search
- 2090 publications selected for review
- 1842 publications included in review
- 861 publications excluded
- 334 duplicate publications
- 527 irrelevant publications after reviewing titles and abstracts
- 248 publications excluded
- 82 did not find the full texts
- 166 irrelevant publications after reviewing the full texts

Classification of data

We classified our included literature as follows, according to methods described in Tight’s Higher Education Research and Development (Tight 2003) and BEME methodology, by the BEME Collaboration (BEME 2009).

1. Basic information: title, publication time, journal name, and author affiliation.
2. Research theme: policy and management, quality and assessment, curriculum and teaching, etc.
3. Study design: comparative study, non-comparative study, review, and systematic review.

We developed a data extraction form and trained four researchers to extract data independently. Thirty percent of the extracted data were randomly rechecked to verify the accuracy of the data extraction.

Data analysis

EPIData 3.02 was used for data entry. SPSS11.5 and Microsoft Excel 2003 were used for data analysis. Basic information, research themes, and study designs were expressed as a percentage.

Results

General information

A total of 1842 articles met the criteria and were include in our study. Our results showed that the number of articles on medical education increased over time: 70.8% of the included articles were published after 2005 (Figure 1).

The included articles were published on 356 journals, 16 of which published more than 20 included articles each (Figure 2); together accounting for almost half (864 articles, 46.9%) of the total number. The top five journals, which each published more than 50 included articles, were China Higher Medical Education, Northwest Medical Education China Higher Medical Education, Medical Education, Research in Medical Education, and Journal of Shanxi Medical University, together accounted for 28.77% of the total number. None of these five journals were indexed by Medline, SCI, or SSCI.

The included 1842 articles were written by authors affiliated with 341 institutions (data not shown). Among these, 59 institutions each published more than 10 articles (Table 1). All these 59 institutions are universities or higher education centers and publications from these institutions together accounted for 66.4% of the included articles. There were 8 institutions with more than 30 articles each, which together accounted for 19.6% of the included papers. All 8 institutions are medical universities.

Research themes

A total of 850 articles (46.1%) on the theme of curriculum and teaching were published, followed in popularity by themes on quality and assessment (527 articles, 17.8%), and policy and management (299 articles, 16.2%; Table 2). This trend remains the same over the years, with the curriculum and teaching...
Study designs

Non-comparative studies dominated the literature on medical education research, accounting for 77.5–87.6% of the amount over the observed years, while comparative studies accounted for only 9.9–18.8% (Table 3). No systematic reviews had been published.

When study designs were compared based on research themes, we found that non-comparative studies dominated for all themes, particularly for the theme of policy and management (85.1%). Comparative studies were used in 19.6% of papers on quality and assessment, 13.7% on curriculum and teaching papers, and 11.4% on policy and management papers. There were a few non-systematic reviews: 10 papers on curriculum and teaching, 5 on policy and management, and 3 on quality and assessment (Table 4).

Non-comparative studies

Since non-comparative studies dominated the included literature, we classified the non-comparative studies into six groups according to BEME methodology (BEME 2009) and Chinese literature searching methods: expert opinion, case report, case series, focus group, action-based, and narrative. One study could have more than one design. The most populated study method was expert opinion (Table 5). When comparing the percentage of these six study methods used in different research themes (Table 6), it was expert opinion.

Control studies

Control studies were classified as cross-sectional, case-control, single group, before and after, time series, cohort, and experimental. Of the 254 control studies, 161 (63.4%) were cross-sectional studies; 30 (11.8%) used experimental designs, including 12 randomized control trials (RCT) and 18 non-randomized control trials; 15 (5.9%) were single group studies; 16 (6.3%) were cohort studies, 13 (5.1%) were time series; and 12 before and after studies (4.7%).

Discussion

In this study, we reviewed the literature on medical education published from January 2000 to December 2008 in Chinese-language journals. We hoped to provide insight into the current status of undergraduate medical education research in China and ways in which it can be advanced.

We found that the annual number of articles on undergraduate medical education research increased over time in China. The five leading journals that published more than 50 articles on medical education are Northwest Medical Education, China Higher Medical Education, Medical Education, Research in Medical Education, and Journal of Shanxi Medical University, accounting for 50% of the theme (35.7–52.8%) predominating in medical educational literature.
included literature. The majority (66.4%) of the articles were from medical education departments or centers, suggesting that research has become an important part of medical education in China. As in other countries, medical education in China has experienced many changes and challenges in the last few years. Chinese medical educators have also adopted innovative approaches to medical education, such as problem-based learning (PBL) (Cao et al. 2007; Shanley & Wang 2008;
indicating that medical education is now incorporating its traditional role of knowledge spread into medical education research in China. An increase in the number of articles addressing medical education is encouraging; however, there still exist some problems, such as the low impact factor of the journals publishing these articles. In fact, none of the five leading medical education journals in China have been indexed by Medline, SCI, or SSCI. Although the quality of journals cannot always be accurately assessed by impact factor (European Association of Science Editors statement on impact factors 2009), studies show that impact factor may be used as a reasonable quality indicator for general medical journals (Tsay 1998; Saha et al. 2003). In fact, the most commonly used measure of journal quality in many circles is still the impact factor (Peleg & Shvartzman 2006).

Our study shows that the most popular theme for undergraduate medical education research in China was curriculum and teaching (46.1%), followed by quality and assessment, and policy and management. This trend accords with that found in other studies. Dimitroff et al. also found that the main concerns of medical education papers were curriculum planning (38.6%), teaching (21.2%), and student assessment (15.5%) (Dimitroff & Davis 1996). Similarly, Regehr (2004) reported a substantial number of research articles involving the discussion

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<th>Study design</th>
<th>Curriculum and teaching (%)</th>
<th>Quality and assessment (%)</th>
<th>Policy and management (%)</th>
<th>Others</th>
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<tr>
<td>Non-comparative study</td>
<td>723 (85.1)</td>
<td>260 (79.5)</td>
<td>260 (87.0)</td>
<td>315 (86.1)</td>
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<td>Comparative study</td>
<td>117 (13.7)</td>
<td>64 (19.6)</td>
<td>34 (11.4)</td>
<td>39 (10.7)</td>
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<td>Review</td>
<td>10 (1.2)</td>
<td>3 (0.9)</td>
<td>5 (1.6)</td>
<td>6 (1.8)</td>
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<td>Total</td>
<td>850 (100)</td>
<td>327 (17.8)</td>
<td>299 (16.2)</td>
<td>366 (19.9)</td>
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<th>Classification of non-comparative studies</th>
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<td>Expert opinion (%)</td>
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and exploration of curriculum and teaching. This suggests that the key themes of medical education research are similar worldwide, which is not surprising, since medical education is an applied domain and curriculum and teaching is the core of medical education.

In our study, non-comparative studies accounted for the majority (84.6%) of the included literature and expert opinion was the most commonly used method. Comparative studies, and more importantly, RCT, which are considered the gold standard of outcome research, were rare in the assessment of educational interventions. Our findings were similar to those in other studies. Wan and his colleagues (Wan & Zhang 2006) also found that, although medical education research is shifting from opinion-based toward evidence-based approaches, qualitative studies still predominate in medical education literature in both China and in the other countries. In fact, 79.2% of the articles published in China Higher Education Research were qualitative studies during 2000–2004. One-fifth of the articles published in Academic Medicine in 2003 were qualitative studies (Shea et al. 2004). Although some experts argued that qualitative research is more appropriate in assessing the effectiveness of educational programs (Majumder 2004), and it is often not acceptable from an ethical point of view to randomly assign learners to receive or not to receive an intervention (Collins 2006), more rigorously designed methodologies have been generally encouraged in medical education research in recent years. Some medical education experts urged medical educators to produce high-quality education research by selecting and implementing the most appropriate methods (Collins 2006). They believe that ethical RCT designs should be used, wherever feasible and applicable, to assess the effectiveness of educational innovations and interventions (Bligh 2000; Torgerson 2002; Majumder 2004). According to a survey of literature on undergraduate medical education, the number of randomized control experimental studies similarly increased from one in 1969–1970 to 37 in 2006–2007 (Baernstein et al. 2007), indicating that there is a global tendency to use more rigorous methods in medical education research. However, we found in our study that although the annual number of published studies on undergraduate medical education interventions has been increasing in China, little change has been made in the methodological rigor of these studies. There is a need for improving medical education research methodology in China. However, being skillful at education research methodologies requires special training and experience (van der Vleuten et al. 2004). In developed countries, there are some international educational programs or associations, such as the Association for Medical Education in Europe (AMEE 2009), and the Association of American Medical Colleges (AAMC 2009), to support and provide training for those who are concerned with or interested in improving their educational research skills. By contrast, there is an inadequate exposure to medical educational research in undergraduate training in China and in other parts of the Asia (Majumder 2004), which might hinder the development of educational research, since choosing a methodology in educational research is as important as in any other type of research (Hutchinson 1999). In China, although institutions like the Center for Medical Education Research and Development was established with the support of the China Medical Board (CMB), and teaching methods and curricular reform were discussed during events like Medical Education Summit for the 8-year medical program in China, there has been no national center to take the lead in providing training on medical education research methodologies. In fact, medical education research in China is still rather embryonic, and no such training has been available to medical educators so far. For medical education research in China to grow and mature, it may be key to create a national center that would bring together health professions education research into a single national framework with an accessible database (Wartman 2004), and create opportunities for medical education researchers to meet and share ideas and resources. What’s more, interdisciplinary and multi-institutional collaboration should be encouraged (Eva & Lingard 2008), as collaboration will enable researchers to accomplish more together than apart and to expand the impact of the research (Collins 2006).

Limitations

This study has several limitations. First, the classification of the research themes was not detailed enough to identify the most popular theme and the most active topics in medical education research in China. Next, we only extracted the affiliation of the first author for each article, and thus, did not examine the condition of collaboration among institutions and multidisciplinary authors, which might deserve much attention. Finally, we only explored the study designs of published literature, but we did not assess the overall quality of research being conducted.

Conclusion

In conclusion, our study found a clear increase in the number of articles on medical education research in China; however, there is a need for medical education research to use more methodologically rigorous designs and interdisciplinary, multi-institutional approaches to ensure research quality, as well as information dissemination and exchange. It is also necessary to conduct personnel training on medical education research methodology. The need for a national center for medical education research is urgent and compelling.

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References


