An overview of medical informatics education in China

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ABSTRACT

Objective: To outline the history of medical informatics education in the People's Republic of China, systematically analyze the current status of medical informatics education at different academic levels (bachelor's, master's, and doctoral), and suggest reasonable strategies for the further development of the field in China.

Method: The development of medical informatics education was divided into three stages, defined by changes in the specialty's name. Systematic searches of websites for material related to the specialty of medical informatics were then conducted. For undergraduate education, the websites surveyed included the website of the Ministry of Education of the People's Republic of China (MOE) and those of universities or colleges identified using the baidu.com search engine. For postgraduate education, the websites included China's Graduate Admissions Information Network (CGAIN) and the websites of the universities or their schools or faculties. Specialties were selected on the basis of three criteria: (1) for undergraduate education, the name of specialty or program was *medical informatics* or *medical information* or *information management and information system*; for postgraduate education, *medical informatics* or *medical information*; (2) the specialty was approved and listed by the MOE; (3) the specialty was set up by a medical college or medical university, or a school of medicine of a comprehensive university. The information abstracted from the websites included the year of program approval and listing, the university/college, discipline catalog, discipline, specialty, specialty code, objectives, and main courses.

Results and conclusions: A total of 55 program offerings for undergraduate education, 27 for master's-level education, and 5 for PhD-level education in medical informatics were identified and assessed in China. The results indicate that medical informatics education, a specialty rooted in medical library and information science education in China, has grown significantly in that country over the past 10 years. Frequent changes in the specialty's name and an unclear identity have hampered the visibility of this educational specialty and impeded its development. There is a noticeable imbalance in the distribution of degree programs in medical informatics in different disciplines, with the majority falling under information management. There is also an uneven distribution of the specialty settings of medical informatics at the various academic levels (bachelor's, master's, and doctoral). In addition, the objectives and curriculum design of medical informatics education differ from one university to another and also from those of foreign universities or colleges. It is recommended that China (1) treat medical informatics as a priority "must-have" discipline to build

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in China, (2) establish its own independent, balanced degree programs, (3) set up a specialty of "medical informatics" under the "medicine" category, (4) explore curriculum integration with international medical informatics education, and (5) establish and improve medical informatics education system.

1. Introduction

The development of medical informatics in China is rooted in medical library and information science. Education in this specialty dates back to the early 1960s. At present, there are a growing number of medical universities that offer training programs for librarians in medical informatics. However, formal undergraduate education in health and medical informatics only began in China in the middle 1980s [1].

An increased awareness of the need for health and medical informatics professionals has encouraged universities to develop specialized education programs in medical informatics [2]. In April 1985, *Norman Bethune Medical University* (now *Jilin University*) established the first professional education program in medical library and information science, with the approval of the Ministry of Education (MOE) of the People's Republic of China (PRC) and Ministry of Health (MOH) of the PRC. Thus, the first 4-year medical informatics undergraduate program was formally launched in China. Since then, *Tongji Medical University* (now *Huazhong University of Science & Technology*), *China Medical University*, and *Hunan Medical University* (now *Central South University*) set up similar professional education programs [3,4]. These four universities created the precedent for China's medical informatics education.

Along with changes in the name of the specialty over the years since then, the focus of research in this area has shifted from medical library and information science education to medical information management education [13,14], information management and information system education [15,16], medical information education [17,18], and medical informatics education [19]. Despite their introduction at different times, these various specialty names are being used simultaneously, so that is not always possible to use them to reliably identify a particular program with the past, present, or future stages of medical informatics education in China.

This review is certainly not the first, and is unlikely to be the last reflection on the field. Previous reviews have addressed the education system [5–8], training objectives, modes of education [9], and disciplinary system [10,11] of medical library and information science. Other papers have focused on curriculum systems and core curricula [12].

The purpose of the present analysis is to reflect briefly on the history of China's medical informatics education, systematically analyze the current status of medical informatics education at various academic levels (bachelor's, master's and doctoral), and offer some reasonable strategies for furthering medical informatics education in China.

2. Retrospective of medical informatics education

2.1. Undergraduate education

There have been three significant changes in the name of the specialty since it was established due to China's reform and opening up in 1980s and the new National Ordinary University and College Undergraduate Specialty Directory in 1998. Medical informatics education in China can be classified into the following three stages that reflect these name changes:

2.1.1. The first stage: medical library and information science education (1985–1992)

In 1986, the original National Educational Commission (NEC) of the PRC directed related units to assess the scientific standing and feasibility of the specialty and the discipline. On August 26, 1987, the NEC issued the *National Medical University and College Undergraduate Specialty Directory*. In this directory, the specialty of medical library and information science, termed "library and information science (medicine, pharmacy)," was included under the category of "applied liberal arts, science and engineering." Since then, medical informatics has been formally established as a discipline and specialty [20]. At this point, medical informatics education in the PRC began to enter a rapid stage of development.

2.1.2. The second stage: medical information management education (1992–1997)

During this time period, a wave of name-changing to "information management" swept across the whole of China due to China's reform and opening up in 1980s. In September 1992, "Intelligence" was changed to "Information" in the name of the National Science and Technology and Information Conference, and the Chinese Science and Technology Intelligence Institute was also renamed the Chinese Science and Technology Information Institute by the National Commission of Science & Technology; in October 1992, the Department of Library Science & Information Science of Peking University became the Department of Information Management. At the same time, the specialty of medical library and information science was renamed "information science (medicine, pharmacy)" according to the *National Ordinary University and College Undergraduate Specialty Directory*, which had also been renamed by the original NEC in 1993 [21]. The four original medical universities also used "medical information management" as the name for their core area when forming new educational programs and course systems.