



Review Article

Fill the gap between traditional and new era: The medical educational reform in Taiwan

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ABSTRACT

The 7-year medical education program in Taiwan has been established since 1949. More than 60 years later, many medical professionals have observed and voiced its deficiencies following the outbreak of severe acute respiratory syndrome. The deficiencies are three-fold: (1) specialties are excessively institutionalized, (2) students engage in passive learning and memorization, and (3) passing one written national examination serves as the means of granting permanent physician qualification. The situation has aroused concerns and discussions among medical professionals and educators for a new medical education program. Authorized by the Conference of Deans of Medical Schools in Taiwan, Prof. Chyi-Her Lin assembled a team for planning medical curricular reform. Subsequently, Prof. Shan-Chwen Chang organized a task force team which has been monitoring the new 6-year program since 2013. The aims of medical reform by Prof. Lin are (1) to eliminate the specialty training part, (2) to use innovative teaching methods to motivate students to learn proactively, and (3) to implement competency-based medical education. Now, the first class of physicians will enter the workplace in 2019, subject to various clinical challenges.

KEYWORDS: *Competency-based medical education, Educational reform, Undergraduate training*

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INTRODUCTION

Medical education is a professional cultivating program in which a student is transformed from a layperson to a physician through systematic learning [1]. It is aimed at cultivating professional physicians who are devoted to life-long learning and self-improvement. According to criticism from the National Committee on Foreign Medical Education and Accreditation in 1998, Taiwan's medical schools began to initiate curricular reform to improve several deficiencies in medical education [2]. During the transformation of Taiwan into a developed country, citizens began to question the high social status of physicians, and educational philosophic thoughts from the USA started to influence the traditional curriculum design. Considering contemporary societal needs, the medical education program should be transformed. This review presents an exploration of the roots underlying the medical educational reform over the past 30 years and the prospects of future physicians in Taiwan [3].


BACKGROUND

Taiwan's society is increasingly diverse and democratic. The increasing national income has engendered lifestyle changes, leading to changes in the forms of diseases. The implementation

of the National Health Insurance Program and the hospital accreditation system has resulted in noticeable changes in the medical environment, especially a new level of citizen entitlement. Such changes have engendered negative effects; for example, hospital sizes are increasing and hi-tech treatments and performance management are prioritized. The conventional curriculum and teaching methods cannot keep pace with the rapid development of medical technology and changes in the medical environment. Furthermore, there has been a lack of professionalism in the curriculum of medical education. The Conference of Deans of Medical Schools passed a resolution of a new medical education program in 2000. A reform of medical education program task force team, also named as "new medical education program working group," was requested to establish and to supervise course effectiveness [4]. Prof. Huang pointed out the necessity of integrating liberal education into existing course [5]. In 2003, severe acute respiratory syndrome spread across Taiwan. Educators aware the core values of the medical profession, compatible with the World Federation for

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Medical Education (WFME). For the response of global standards from WFME, several medical schools strived to facilitate the integration of basic science and clinical disciplines, besides, emphasis on interpersonal communication [6]. Since 2005, medical specialists and the government have collaborated on restructuring the local medical education program; the Ministry of Health and Welfare of Taiwan launched the postgraduate year program (PGY program) on a trial basis before officially launching it in 2011 [7].

Since the launch of the program, physicians holding a practicing certificate must complete a PGY course in qualified hospitals before they can apply for specialty resident training. According to the comprehensively implemented 6-year medical education program, from 2019, medical graduates under the new PGY program will be required to 2-year training [8]. In this review, we report the disruption caused by the gap between the two education programs and propose possible solutions for the problems in the transition period.

INTEGRATION OF PRE-MEDICAL AND MEDICAL EDUCATION PROGRAM

Taiwan’s medical education program has undergone five main transformations [Table 1], as revealed by an analysis of the program design from various perspectives: First, the program previously emphasized individual discipline, but currently, the program emphasizes clinical case integration. Second, the program was previously based on those of other countries, but currently, the program is witnessing a transformation in accordance with Taiwan’s higher education environment. Third, the program involved a one-stage learning process, but it currently involves a two-stage learning course, including undergraduate and PGY. Fourth, the program previously involved a superior elite education approach, and this has currently been transformed into a scientific education approach involving liberal humanism. Finally, the program previously applied a uniform teaching approach, and this has been replaced by a diverse, proactive, and innovative learning environment [9].

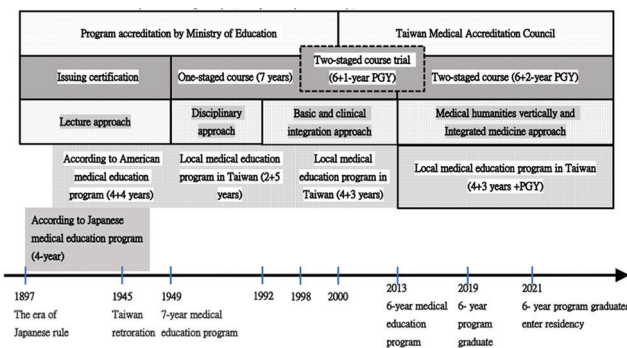
Prof. Hsieh proposed an integrated course on basic and clinical sciences in 1992 [10,11]. Moreover, the time-based

educational approach adopted in the previous program has been restructured. Specifically, an outcome-based educational approach that is based on those of other countries transformed the old medical education program into a 6-year program and established criteria for qualified physician status according to the required professional abilities for health care [12]. Core competencies comprising various combinations of knowledge, skills, and attitudes are increasingly recognized and defined. Furthermore, the various clinical standards of physicians with different core competencies are combined to establish milestones for clinical physicians, the practice results of which are ultimately demonstrated in the clinical outcomes [13,14]. Numerous countries have developed unique competency-based medical education (CBME) systems [15]. Canadian scholars recommended the implementation of a responsible and flexible learner-centered educational method instead of the time-based educational approach. They identified 10 common factors that can be categorized into four main themes as follows: Organizing framework, rationale, contrast with time, and implementation; and six subthemes: Outcomes and milestones defined, the curriculum of competencies, demonstrable abilities, assessment of competencies, learner center, and societal needs [13,16]. Accordingly, in medical education, eliminating the discipline-centered teaching method might accelerate the diversified integration of courses oriented toward clinical practice and basic medicine. The essence of core-CBME should be thoroughly explored before the introduction of localized CBME in Taiwan [17].

CURRICULUM OBJECTIVES OF THE 6-YEAR MEDICAL EDUCATION IN TAIWAN

Physicians play a vital role in society. The book “Educating Physician” reveals the three main aspects of physician development: Cultivating expertise and relevant abilities to care for patients; developing inquiry and innovative thinking; and participating in social networks and contributing to society [3]. In the 21st century, medical education involves the following objectives: Endeavoring to link theoretical knowledge and practical experience; creating opportunities for students’ early engagement in patient care, thus enabling students to achieve in-depth learning when making reflections; and stimulating students’ inquiries and critical thinking during problem-solving. Abraham Flexner emphasized the knowledge structure and liberal education; considered basic education on medical treatment as the foundation of medical education; highlighted the importance of communication skills, physical examination skills, and attitude in Hi-tech medical environments; and should be subjective to integration of evidence-based medicine and medical ethics to enable medical students to adapt to public perception toward future medical care [18]. On the basis of experiencing 23 years following the implementation of Taiwan’s health insurance, the medical education program should promote community medicine and general medicine education, emphasize students’ self-directed learning, and advocate the inquired and interactive teaching methods. Medical schools and educators devoted to invited faculty and curricular committee joined this evolution in medical education for decades. Organ-based and clinical cases were integrated to

Table 1: Taiwan medical education program and instructional approaches in evolution



The events in Taiwan society was labeled in arrowed-line chronologically (compiled by this study). PGY: Postgraduate year

teaching plans to link all scientific praxis in human. There were generally three sections of the new program as follows: (1) pre-medical section, (2) integrated medical section, and (3) clinical medical section, at the same time, vertically combination with medical humanities and public health [Table 2]. In addition, educators aimed at enabling students to experience the diverse roles of a physician, such as advocating patient welfare, developing and incorporating innovations, and collaborating with inter-professional team members in the workplace [3]. Thus, innovative and student-centered instructional methods were massively adopted, such as problem-based learning [19].

CHARACTERISTICS OF THE 6-YEAR MEDICAL EDUCATION PROGRAM

In the current 6-year medical education program, students are granted qualification as physicians after graduation but short of the internship. They are equipped with clinical care skills and medical humanities knowledge, ingrained with the concept of lifelong learning. According to “Educating Physician,” patient care should be incorporated into clinical skill training programs. Because clinical skill training entails progressive advancement, the curriculum must facilitate students’ continuous acquisition of knowledge and experience in patient care; such a curriculum can thus enable students to acquire in-depth knowledge of disease, engage in logical thinking during problem-solving, and achieve proficiency [3,20]. The cognitive theory of teaching proposed by Anderson comprises four knowledge levels, namely practical knowledge, theoretical knowledge, procedural knowledge, and metacognitive knowledge, the highest level; this theory is reshaping the structure of the curriculum of medical education [21]. The overall goal of such a curriculum is to create a continuous and thorough medical learning process.

A medical education that highly integrates clinical learning in basic curriculum facilitates context-based reflection. By establishing highly integrated courses with case-based learning and integrating the experiential learning of medical students

regarding their medical knowledge, skills, and attitude, students can be guided to develop self-awareness and achieve self-regulated learning, which can enhance their confidence in clinical competency.

PROSPECTS OF MEDICAL EDUCATION CONTINUUM

The purpose of educational reforms is to establish students’ competencies in addressing future challenges. The PGY program in Taiwan was analyzed using the six core competencies defined by the Accreditation Council for Graduate Medical Education as the longitudinal index for assessing contemporary physicians before and after their graduation [22]. These competencies should be adjusted and then incorporated into the longitudinal education fostering system. In response to the underpinning objectives of the curriculum, the innovative teaching activities should benefit medical students in improving their learning outcomes and be examined regularly to evaluate the effectiveness [23].

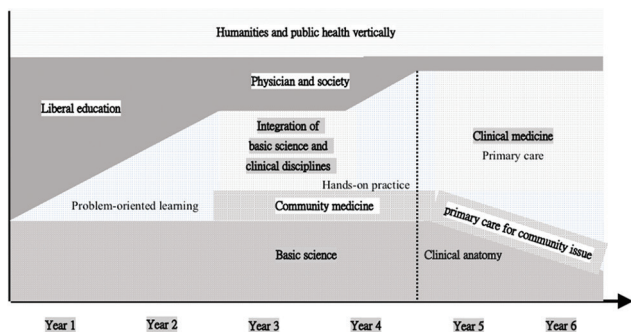
Evidently, since 2013, an objective structured clinical examination has been incorporated as a prerequisite component into the second part of the national certification examination of physician in Taiwan. This nationwide standardized examination is aimed at testing the core competencies of medical students. Furthermore, every 3–6 years, Taiwan Medical Accreditation Council conducts on-site visits to all medical schools and assesses the learning effectiveness of various teaching methods developed at four levels: The university, department, teachers, and students. Subsequently, the Joint Commission of Taiwan hosts the PGY training program for medical students, achieving a competency-based continuing education system for training prospective physicians on clinical care [24].

In Taiwan’s higher education environment, only the top 1300 high school students are qualified for enrolment in medical schools. However, the previous time-based educational approach requires 12 years for students to mature as an attending physician. The old program could not sustain the considerable global change in digitization and the globalization of finance and logistics. The WFME analyzed contemporary global medical trends and suggested that a medical professional in the 21st century should demonstrate nine standards for basic medical education, which are consistent with the aforementioned six core competencies of physicians. Those movement of standards should be student-activated instruction, prioritize patients with good communication, student influence on program development and cultivating medical leadership, emphasize the provision of high-quality medical care to patients through self-regulated learning, aboard and distant learning assist with technology and utilization of skills laboratory [6]. In the following discussion, we pointed out educational strategies to bridge the gap of educational reforms.

STRATEGIES OF MEDICAL EDUCATION REFORMS

Peter S. Temes emphasizes that the following three aspects should be considered in education reform: Keeping it real, making it new, besides, recruiting and retaining the right teacher [25]. Strategies and practices in education reform that are established on the basis of a realistic understanding fulfil

Table 2: The curriculum design from 6-year medical education program was carried out since 2013 in Taiwan. This diagram adopted curriculum in medical school of National Yang Ming University as prototype. (compiled by this study)



The experiencing course of to-be a physician was arranged in Year 2, according to National Cheng Kung University, Tzu Chi University and Kaohsiung Medical University

the philosophy of “education is life itself.” The changes in Taiwan’s 6-year medical education program are outlined as follows: Shortening the education period and thus enabling medical students to receive clinical training earlier; helping medical students to engage in the PGY as qualified physicians in clinical practice; and developing comprehensive core competencies for physicians. This “learning-by-doing” in the workplace is consistent with Dewey’s perspective [26]. The essential elements of Dewey’s perspective include evoking students’ intrinsic curiosity, which might subsequently be transformed into active motivation for learning continuously; cultivating problem-solving and task-achievement abilities by using project-based learning; and transforming classrooms into laboratories and encouraging students to engage in life-long learning. The key factor still underlines clinical teachers’ guidance throughout the learning process, the transformation of medical knowledge into practical skills, and management of clinical tasks, all of which closely match the concept of CBME and outcome-based education. The bottom-up reform of the medical education program and the top-down reform of the education program led by medical educators would complement each other only when teachers are given autonomy in teaching activity.

TOP-DOWN IMPLEMENTATION OF NEW TEACHING METHODS

As mentioned, the formal curriculum is transformed using new teaching methods and medical humanity is emphasized in the new medical education program [Table 2] [19,27,28]. Thus, the 6-year medical education program creates a complete learning environment using an innovative curriculum design that combines a formal curriculum, an informal curriculum, and a hidden curriculum (i.e., making it new). Several examples of curriculum design are presented as follows. In Chung Shan Medical University in Taiwan, a flipped teaching method is applied in the anesthesiology course; this enables students to learn at their own pace and thus improve their professional competencies and engage in self-directed learning by engaging in pre-class preparations and using the interactive online teaching platform Zuvio in the class [29]. Several institutions have also applied a hidden curriculum. For example, Tzu Chi University in Taiwan has implemented a silent mentor program aimed at cultivating the spirit of service in students [28]. National Cheng Kung University in Taiwan has implemented an on-doctoring program that emphasizes the cultivation of human-centered thinking and lifelong learning in students [30]. Furthermore, the Miharashi medical service team in Tzu Chi University has, since 2006, taught students about serving others by arranging visits to indigenous tribes [31]. Such visits enable students to perceive health needs from residents of remote areas in eastern Taiwan and consequently inspire students to respect life and engage in self-reflection. Harden proposed SPICE model to design curriculum during implement of educational reform strategies [32]. Educators thus use problem-based methods to evaluate a community’s needs and provide learner-centered courses for creating a comprehensive and systematic learning environment. However, numerous teachers and parents have

raised concerns about the practical processes of an informal curriculum and a hidden curriculum in Taiwan.

ADAPTATION OF TEACHERS IN CLINICAL TEACHING

Teachers play a key role in the implementation of new teaching methods. The literature review revealed that the effectiveness of flipped teaching depends on learners’ compliance and the established learning space [33,34]. Thus, several issues with the implementation of the teaching strategies in the new medical education program involve recruiting and retaining the right teachers and defining the required teaching abilities of clinical teachers in medical schools [23]. Harris advocated that medical teachers can refine themselves by not only advancing in the medical profession but also enhancing their teaching skills and general competencies in the contemporary medical system. These problems might also occur in the new education program. An example of such problems is as follows: Determining how existing clinical teachers under the old system can understand the basic competencies defined in the 6-year medical education and how they can adapt instruction methods to attain learners’ competencies and allocate educational resource according to various teaching objectives effectively. A disruptive education environment might impose a burden on clinical physicians and result in patient dissatisfaction.

These problems inherently pertain to quality improvement in faculty development and in human resources. Prof. Huang analyzed problems in the quota of full-time teachers in medical schools in Taiwan and suggested that the full potential of such teachers’ passion and skills for teaching was not raised [5]. In addition, universities and schools face difficulties in supervising clinical teachers, and this leads to reduced teaching quality. A necessary reform depends upon bringing together around common goals all of the key players in the organization, regulation and conduct of medical education, taking an example as Emory School of Medicine in the US [35]. Regarding the recruitment of teachers in medical schools, we suggest the following changes: Stakeholders establishing recruitment standards that are based on teaching performance instead of research publications, which were emphasized in previous educational program; adoption of teaching experience and faculty’s competencies as the basis for determining the number of courses the teacher should undertake; implementation of teacher evaluation to prevent senior faculty from passing on most of their courses to junior members in order to ease their own burden; supervisors inspecting in-service teachers’ performance in lifelong learning and passion for teaching, moreover, developing innovative teaching activities; the educational institutes providing supplementary and enabling training courses for unqualified teachers to receive credit for faculty development and fulfil teaching obligation in medical education.

Proponents of education reform advocate the transformation of clinical learning environment, but the center of the medical program, the patient, is ignored during the exercise of the reform. Physicians’ abilities are actually judged by patients in the clinical setting. When patients encounter novice graduates,

who are considered to be adequately capable by medical schools, they cannot distinguish physicians from the new and the old program. Therefore, clinical personnel may shoulder any response and conflicts in the clinic during the transition of two educational programs. The burden imposed on physicians who also serve as clinical teachers is heavier than ever. To bridge the gap between the new and old medical education programs, clinical faculty must adhere to the essential goals of education, share clinical, and teaching responsibilities with each other. Proponents of education reform must remain committed to the principle of prioritizing the interests of patients, regardless of the corporatization of universities and the unspoken pressure from authority.

CONCLUSION

In 2019, the first class of medical students subjected to the 6-year local medical education program will enter the workplace. They have been taught using innovative teaching methods accompanied by a CBME framework; hence, they have faced diverse assessment and gained novel learning experiences. Nevertheless, to fill the education gap in the era of the reform, the industry, government, and academia have devoted efforts to improve policies and modify the integrated courses of liberalism and basic clinical medicine. Various challenges are encountered in the clinical environment, which contains the most learning opportunities. We believe that the medical teams may be exhausted if students graduating from the new education program are designated as PGY before their confidence and professional capabilities in practicing clinical tasks independently are confirmed. In addition, concerns raised in the medical environment might restrict the professional development of medical students graduating from the new program. Finally, medical schools should focus on the systematic development of clinical teachers, provide lifelong training programs for teachers, emphasize the protection of patients' rights, and at the same time, the development of medical personnel's comprehensive profession in clinical environment continuously.

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Conflicts of interest

There are no conflicts of interest.

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