

Current status and future prospects of the development of clinical Pharmacy in China: A SWOT analysis

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Abstract: In many industrialized countries, clinical pharmacy has developed into a separate discipline and become a vital part of inpatient care in hospitals. However, as compared to many established branches of medicine, clinical pharmacy is still in its infancy, with much room for growth, improvement, and recognition by both the medical community and patients. In this study, a widely-recognized development strategy analysis tool, Strength, Weakness, Opportunity and Threat (SWOT), was used to systematically address several key issues to the development of clinical pharmacy in China. This analysis aims to provide feasible recommendations for the development of clinical pharmacy in China by identifying current problems and growth opportunities. Full development of clinical pharmacy as a mature clinical discipline will help promote the rational use of drugs by both clinicians and patients and lead to enhanced drug efficacy and safety.

Keywords: SWOT analysis; Clinical pharmacy; Hospital pharmacy; China.

INTRODUCTION

The discipline of clinical pharmacy first emerged in the U.S. in the 1960s with a mission to provide improved healthcare to patients by promoting the use of the most effective and safest medications (Miller, 1981, Stolar, 1982). In China, the discipline of clinical pharmacy was not established until the early 1980s, when the Ministry of Health (MOH) selected 12 hospitals to initiate pilot programs in clinical pharmaceutical care (Abou El Enein, Mohammed *et al.*, 2010).

Recent reforms made to the Chinese healthcare system, however, have created conditions favorable to the growth of clinical pharmacy and other emerging disciplines (Luo, Luo *et al.*, 2012, Wang, Rao *et al.*, 2013). In January 2002, the MOH committed to the gradual building of a nationwide network of hospital pharmacies staffing clinical pharmacists. In 2005, the MOH established "Pilot Training for Clinical Pharmacist" and in 2007 "Pilot Programs for the Clinical Pharmacist System". Pilot hospitals implemented these administrative orders and have hired many pharmacists with experience in clinical work through active research and direct practice (Bhatt-Mehta, Buck *et al.*). Academic associations related to clinical pharmacy or hospital administration, mainly referred to the Chinese Pharmaceutical Association (CPA), Chinese Medical Association (CMA), and Chinese Hospital Association (CHA), have prospered and provided platforms for the development and progress of clinical pharmacy. For example, during the "Twelfth Chinese Pharmacists Week" held by the CPA in Jiangsu

Province in 2013, nearly 2000 pharmacists discussed (among other topics) "Development and Rational Use of Drugs in Clinical Practice" and this will be followed up in Jiangxi Province during the 2013 Chinese Clinical Pharmacy Annual Conference "the 9th Chinese Clinical Pharmacist Forum" hosted by the CHA. Also, the Second National Annual Conference sponsored by the Clinical Pharmacy Branch of CMA has been held in Hangzhou in April, 2013 and more than 3000 hospital pharmacists attended the conference. These meetings are invaluable for creating awareness of clinical pharmacy in the medical community and also in general public.

In this paper, a SWOT (strength, weakness, opportunity, and threat) analysis was used to assess the internal and external environment of the clinical pharmacy in China. The four aspects from SWOT of the discipline will be reviewed and analyzed. This research attempts to describe the current situation and future developments in clinical pharmacy, and provides valuable information for practitioners to update discipline development strategies and to improve pharmaceutical care level.

SWOT approach

The SWOT is a technique commonly used to assist in identifying strategic directions for an organization or practice. It is currently the standard methodology used for strategic planning and has been used extensively in higher education, healthcare, and other fields (Dixit and Marahatta, 2008, MacPherson, MacArthur *et al.*, 2013). Specifically, SWOT allows analysts to categorize factors into the internal (strengths, weaknesses) or the external (opportunities, threats) as they relate to a decision, enabling comparison of opportunities and threats with

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strengths and weaknesses, respectively. The strengths and weaknesses of a system are determined by internal elements, whereas external forces dictate opportunities and threats. Strengths can be defined as any available resource that can be used to improve performance. Weaknesses are the flaws or shortcomings of any system that may cause a loss of competitive advantage, efficiency, or financial resources (Casebeer, 1993, van Wijngaarden, Scholten *et al.*, 2012). Sometimes it is recommended that opportunities and threats are identified first in order to reveal the system's strengths and weaknesses. However, many of the threats are based on weaknesses (MacPherson, MacArthur *et al.*, 2013, Uhrenfeldt, Lakanmaa *et al.*, 2012).

SWOT analysis of clinical pharmacy in China

Clinical pharmacy integrates pharmacy and clinical practice into a patient-centered field that identifies and applies the most effective medicinal regimens currently available (Rathbun, Hester *et al.*, 2012, Saseen, Grady *et al.*, 2006). The future development of clinical pharmacy requires a strategic long-term planning. By considering this discipline as an independent organization, we can utilize SWOT analysis, to identify and categorize current favorable or threatening factors, helping for gaining a more explicit development strategy.

Strengths

Existing infrastructure and highly trained professionals knowledgeable in the rational use of medication

The clinical pharmacist has a variety of responsibilities, including drug formulation, administration, patient education, consultation, and parenteral nutrition, all of which require a high level of expertise. Most hospital-based pharmacists majored in pharmacy and possess extensive knowledge of current pharmaceuticals, the safe and rational use of medication, and information searching tools. This skill set allows clinical pharmacists to make valuable contributions to clinical practice. Moreover, pharmacists are generally more cognizant of rational drug use and potential adverse effects and interactions than other clinicians, and so can focus on identifying and resolving problems arising during medication. Indeed, given the current situation in many hospitals, physicians and nurses are unlikely to possess all the necessary knowledge to choose the most effective and safest regimen or to alter treatment in a timely matter in cases of suboptimal response.

Training and education of clinical pharmacists to optimize core competence and organizational structure

In 2005, the MOH of China issued a directive for establishing pilot training programs and a nationwide licensing system for clinical pharmacists. Depending on career experience, the trainees directly participated in clinical administration of medication under the guidance of clinicians. Over ten pilot hospitals were selected, and their experiences have created a foundation for

standardized training of clinical pharmacists. West China Medical College (now called West China Center of Medical Sciences, Sichuan University) first established a 5-year undergraduate major in clinical pharmacy in 1989, and programs in clinical pharmacy were subsequently established in a number of prestigious Chinese universities and colleges. Subsequently, Clinical Pharmacy was set up as a second level discipline by the School of Pharmaceutical Sciences of Peking University, which offers Master's and Doctoral programs. As of 2010, seven institutes of higher education, namely Peking University, China Pharmaceutical University, Shenyang Pharmaceutical University, Sichuan University, The Second Military Medical University, Shanghai Jiao tong University, and Beijing University of Chinese Medicine, respectively, have established doctoral programs in clinical pharmacy, indicating that the discipline is approaching maturity (Jiang, Liu *et al.*, 2012, Jiang, Liu *et al.*, 2011). In addition, the staffing of hospital pharmacies is in transition from secondary and junior college students to undergraduates or above, especially in provincial or municipal-level large-scale hospitals or medical institutions. The influx of pharmacists holding graduate degrees and clinical specialties has created an unprecedentedly favorable condition.

Brand effect and platform strength

The MOH's pilot programs of 2005 and 2007 aimed to establish 30 to 50 training bases for clinical pharmacists and to train 300 to 500 clinical pharmacists with independent working capacity. Due to these pilot programs, some medical institutions, especially the pharmaceutical departments in comprehensive large-scale hospitals, are staffed by experienced clinical pharmacists. Moreover, the training programs are continually improving and there is now a network of facilities providing training and teaching with standardized assessment. Nearly 100 medical institutions have been approved as pilot sites for clinical pharmacist training by the MOH.

It is also worth mentioning that the clinical pharmacy disciplines at the First Affiliated Hospital of Zhengzhou University, along with 4 other units were designated as the first National Key Discipline sites by the MOH in 2010 to establish a standard training and evaluation paradigm for all of China. A second round of National Key Disciplines evaluations of clinical pharmacy is due to begin soon. The growth in the number of such institutions and the standardization of training and evaluation (licensing) is expected to be able to greatly drive the advancement of clinical pharmacy in the near future.

Weakness

Inadequate emphasis on clinical pharmacy and regional inequality

Clinical pharmacy emerged relatively late in China. Since the beginning of the new century, a series of directives

Table 1: The first 19 clinical pharmacist pilot training bases in China established by MOH (issue date: 2005.11)

No.	Organization Name	Training direction
1	Beijing Jishuitan Hospital	Orthopedics
2	Xuanwu Hospital, Capital Medical University	ICU, Neurology
3	Shanghai Jiao Tong University School of Medicine, Ruijin Hospital	Organ transplantation, Anti-infection
4	Shanghai Jiao Tong University School of Medicine, Renji Hospital	Cardiovascular
5	Shanghai Jiao Tong University School of Medicine, Xinhua Hospital	Blood chemotherapy, Anti-infection, Pediatric medicine
6	Zhongshan Hospital, Fudan University	Cardiovascular, Respiration, Digestion
7	The First Central Hospital of Tianjin	Respiration
8	Tianjin Medical University Cancer Institute and Hospital	Tumor chemotherapy
9	Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University	ICU, Tumor chemotherapy
10	The First Affiliated Hospital of the College of Medicine, Zhejiang University	Kidney medicine, Tumor
11	Qilu Hospital of Shandong University	Tumor chemotherapy, Cardiovascular, Anti-infection
12	Shandong Provincial Qianfoshan Hospital	ICU, Cardiovascular
13	Shandong Provincial Hospital	Anti-infection, Cardiovascular, Tumor chemotherapy
14	West China Hospital, Sichuan University	Anti-infection
15	The Second Xiangya Hospital of Central South University	Cardiovascular, Endocrine, Anti-infection
16	Nan Fang Hospital of Southern Medical University	Cardiovascular, Respiration, Hematology
17	The General Hospital of Beijing Military Region	Anti-infection
18	Changhai Hospital of Shanghai	Digestion, Respiration
19	The General Hospital of Chengdu Military Region	Anti-infection, Respiration, Tumor chemotherapy, Cardiology

Table 2: SWOT analysis of the development of clinical pharmacy in China

Strengths	Weakness
<ul style="list-style-type: none"> ■ Existing infrastructure and highly trained professionals ■ optimizing personnel composition and structure ■ brand effect and platform strength 	<ul style="list-style-type: none"> ■ inadequate emphasis and regional inequality ■ disconnection between academic learning and clinical practicing ■ lack of criteria and fear of difficulties during transition period ■ benefits can't be demonstrated easily in current health system
Opportunities	Threats
<ul style="list-style-type: none"> ■ Vast need for professional pharmaceutical care ■ increasing interdisciplinary cooperation ■ Support and promotion of medicine capital markets 	<ul style="list-style-type: none"> ■ low social approval ■ inherent risk and uncertainty of pharmacotherapy
Strategies:	
<ul style="list-style-type: none"> ■ SO: Strengthen clinical practice and build up disciplinary core competitiveness ■ ST: Emphasize drug use education and promote the concept of services-oriented pharmacy ■ WO: Optimize standard work procedures and emphasize clinical specialization ■ WT: Gather data to demonstrate the service value of pharmaceutical care 	

have established regulations requiring hospitals nationwide to hire full time clinical pharmacists. However, such staffing process has been slow. Many hospital administrators still regard the primary function of pharmaceutical departments as safeguarding the medication supply and have often refused to allocate

sufficient human resources and materials to hospital pharmacies and failed to propose plans to develop clinical pharmacy as an independent discipline. In many hospitals, there are few pharmacists willing to take on clinical responsibilities. In addition, the development of clinical pharmacy in many regional hospitals, particularly in

second-grade hospitals or below, lags behind that of larger hospitals in metropolitan areas such as Beijing, Shanghai and Nanjing (Cai, Tan *et al.*, 1994, Tang, 2012). Moreover, many hospitals are doing only the minimum required to pass routine inspections from superior administration divisions.

Insufficient connection between academic learning and clinical practicing

Current pharmacy education still emphasizes traditional pharmaceutical science and medicinal chemistry, and students receive little training in diagnosis or treatment. Thus, graduates are usually unqualified for corresponding duty in hospitals. Clinical pharmacist is a position requiring considerable practical experience. Most hospital-based pharmacists lack the clinical knowledge and skills necessary to assist and communicate with medical staff (Wang, Chen *et al.*, 1993). A survey in grade-three class-A hospitals in Guangzhou revealed that 81% pharmacists considered laws and regulations, traditional misconceptions and the lack of specialized educational opportunities were the major factors blocking the implementation of clinical pharmacy services. Though the lessons drawn from multiple drug-induced diseases and the routine failure of drug therapy have shifted the emphasis in pharmacy education from “chemical mode” to “biomedical mode”, sustained efforts are still required to change the focus of pharmacy education from “comprehensiveness and theory” to “application and practice”.

Lack of uniform criteria and fear of difficulties during current transition period

There is no authoritative consensus in China on the working model for clinical pharmacy among national medical administrations and medical institutions. Critical issues that urgently require clarification included the duties and rights of clinical pharmacists, the degree of independence allowed, the final authority for dispute resolution, remuneration, and protocols of cooperation with other health care professionals. In 2002, the MOH formulated "Interim Provisions of Medication Management in Medical Institutions", which intended to provide guidelines. However, the lack of specific operational procedures and difficulties in implementation still impede the participation of pharmacists in clinical treatment. There are also no established standards to judge work quality. Thus, most hospital pharmacists work as pharmaceutical technicians occupied with medicinal preparation and dispensing.

Difficulties in highlighting the medical and economic benefits

Pharmaceuticals are a major cost for both patients and hospitals. Hospitals are under tight budgets and clinical pharmaceutical care rarely produces tangible economic benefits to the hospital as a whole. This may explain why

hospital administrators have not been major backers of clinical pharmacy. Nonetheless, the timely suspension of ineffective drugs or drugs that induce signs of impending adverse events will save the hospital and patients money in the long-term (as well as improving patient care). However, metrics for such cost savings are difficult to define. Moreover, China's current medical policy mainly reimburses the patient rather than the hospitals. Hospitals and other medical service institutions can only charge a limited medication service charge based on the total value of the drugs administered and this system encourages the hospital to prescribe more drugs in order to earn income.

Opportunities

Vast need for professional pharmaceutical care

It is now realized and well accepted that a more rational approach to medication will enhance patient care at reduced cost (Hamblin, Rumbaugh *et al.*, 2012, Karnon, Campbell *et al.*, 2009). China has a great need for improvement in this regard. Though challenges remained, there are many opportunities for clinical pharmacists to initiate health care improvements. In September, 2011, the CMA officially established the Clinical Pharmacy Branch Association, making clinical pharmacy one of over 80 distinct medical disciplines. This is a milestone that could help attract qualified practitioners to the field, facilitate academic exchanges and lead to the standardization of rational therapies and safety guidelines. It is anticipated that through increased awareness of the potential contribution of pharmacists in the Chinese healthcare system, more opportunities for trained pharmacists will be made available to satisfy the vast pharmaceutical care need of the country.

Increasing interdisciplinary cooperation

Globalization and information technology have greatly expanded the opportunities for exchanges of ideas and cooperation. In the U.S., where clinical pharmacy services were established more than 40 years ago, a large proportion of hospitals have clinical pharmacists and there are as many as 17 pharmaceutical professionals for every 100-hospital beds. This level of staffing and expertise allows for greater training opportunities. Starting in 2011, the CPA began sending outstanding young clinical pharmacist for abroad training to enhance work performance and academic knowledge of the field, and most importantly to develop pioneering clinical pharmacists of the next generation. Increasing exchange and cooperation will be a strong stimulus of growth in this field.

Support and promotion of medicine capital markets

Medicines are a special commodity with a value dependent on scale of production and clinical utility. However, most prescription medicines are purchased by medical institutions and the prescribing rights are mainly controlled by physicians, so medical institutions hold the

dominant position in medicine capital markets. Based on the experiences of health care systems in developed nations, it is undeniable that capital markets will play an important role to affect the development of clinical pharmacy. At present, state medical institutions, as the main body of medical services, are still unable to operate independently without financial support from the state. It is reasonable for governments to intervene and sponsor medicine capital market, and this practice is unlikely to completely change in the short term. Thus, how to take advantages of medicine markets should be a top priority for administrators and supervisors in health care institutions.

Threats

Low social approval

The impacts of clinical pharmacy on patient care and clinical outcome are generally not appreciated by the public, while the full potential of the discipline may not be fully acknowledged even by other health care professionals (Fang, Yang *et al.*, 2011). However, in the U.S. and other developed European nations, clinical pharmacists are responsible for providing a higher cost-effect ratio and more efficient medical treatment for patients. Clinical pharmacists also play a vital role in the transition to generic drugs and from intravenous to oral drugs.

The inherent risk and uncertainty of pharmacotherapy

Drug therapy will always carry a degree of risk. With more drugs on the market, the chances of adverse events are continually increasing. Moreover, patients no longer place trust in unqualified physicians. This lack of trust may be exacerbated by media reports of malpractice, which are now a big social problem in China. Clinical pharmacists are equally at risk and some practitioners may be unwilling to enter the field for this reason. However, the current situation underscores the need for enhanced interaction between physicians and clinical pharmacists to reduce drug-related misadventures and re-establish trust between patient and caregiver. Clinical pharmacists should take the lead in evaluating the efficacy of new medications by cooperating in multicenter studies.

Strategy

According to the principles and methods of SWOT analysis, four types of organizational development strategies, SO-, ST-, WO- and WT-, are proposed to maximize strength, minimize weakness, utilize opportunity, and avoid threat. Based on this analysis, we propose the following strategies.

SO-strategy: Strengthen clinical practice and build up core competitiveness

Ultimately, the growth of clinical pharmacy will depend on pharmacists. Pharmacists must shift focus toward patient care and clinical knowledge through clinical practice. As application-oriented professionals,

pharmacists are obliged to master a series of laws and provisions, such as "Pharmaceutical Administrative Law", "Prescription Administrative Policy", "Provisions on Medicine Issues in Medical Institutions", "Administrative Measures on Monitoring of Adverse Drug Reactions", "Guiding Principles on The Clinical Use of Antibiotics " and "Administrative Measures on Narcotic and Psychotropic Drugs". In the new era, pharmacists must possess more basic medical knowledge related to diagnostics and pharmacotherapeutics. In addition, clinical pharmacists should be familiar with the catalogue of supplied drugs in hospitals, including generic name, category, specification, drug form, recommended dosage, mechanism of action, pharmacodynamic and pharmacokinetic characteristics and incompatibility. Only in this way can pharmacists play a unique role in clinical practice and establish core competitiveness in providing healthcare service.

ST-strategy: Emphasize drug use education and promote the concept of services-oriented pharmacy

Clinical pharmacists often neglect the importance of patient education on the proper use of drugs and the importance of administrative procedures. Actually, one of the major breakthroughs is to administer patients' use of drug on the basis of drug use education under current medical system in China. The concept of "patients first" should be vigorously pursued and the idea of service-oriented pharmacy be promoted. A patient-centered approach will enhance patient approval of clinical pharmacists, allowing for continued clinical experience by hospital pharmacists and open communication lines between pharmacists and other medical staff. The acceptance of the clinical pharmacist's input by patients, doctors, and nurses will help promote the modernization of working procedures in clinical pharmacy. To accomplish this mission, pharmacists will require both clinical expertise and patient handling skills, primarily honesty and compassion.

WO-strategy: Optimize standard procedures and emphasize clinical specialization

As the number of drugs and treatment techniques continue to multiply, selecting the best drug therapy is a greater challenge than ever. Pharmacists tend to play a limited role in making decisions on clinical treatment and thus in the rational use of drugs. Specialization may enhance confidence in the advice of clinical pharmacists and thereby enhance the image of clinical pharmacy as a whole. Firstly, clinical pharmacists should find a suitable entry point and then thoroughly implement working procedures. Secondly, a standard working system should be established, which specifies the contents and details of pharmacy services and clarifies the duties, rights, fee schedules and liabilities. Thirdly, pharmacists should serve the patient diligently to accumulate clinical experience and highlight the strength of service-oriented pharmacy. Pharmacists should never switch frequently

between different departments but rather specialize within a core group within a single clinical department. Additionally, the concept of cultivating "highly-qualified pharmacists in a small quantity" should be adopted as a defining principle of discipline development. Key sub-disciplines should be established and multi-disciplinary interactions should also be emphasized that may create new disciplines with their own characteristics.

WT-strategy: Gather data to demonstrate the value of clinical pharmacy

Highly efficient service delivery by clinical pharmacists will improve the level of rational drug use, prevent the incidence of drug-induced diseases, reduce medical costs, and lower medical risks (Kopp, Mrsan *et al.*, 2007). In the 1990s, the journal JAMA published reports estimating the annual cost attributable to all adverse drug events for a 700-bed teaching hospital (5.6 billion) and concluded that these costs were reduced by 66.4% if clinical pharmacists participated in the treatment (Bates, Spell *et al.*, 1997). This result should be an enhanced image of clinical pharmacy. However, no systematic studies have evaluated the value of clinical pharmacist for reducing such costs in China. Thus, pharmacy staff should focus on prevention of such costly errors. Demonstration of risk reduction or actual event prevention should convince hospital administrators of the value of clinical pharmacy. It is expected that hospital supervisors and administrators will gradually emphasize on the construction and development of clinical pharmacy, along with the promotion of service-oriented concept and clinical value.

CONCLUSION

In spite of rapid progress made in the discipline of clinical pharmacy in China, there is still a wide gap in-patient and professional acceptance and national standards as compared to developed nations. Given the demonstrable value of clinical pharmacy to patients and hospital budgets, further development of clinical pharmacy should be viewed as an urgent task. In this study, SWOT analysis was adopted to describe and summarize the current status of clinical pharmacy in China. Analysis outcomes suggest that clinical pharmacists should promote public awareness of the profession and its significance to drug treatment efficacy, safety, and cost-effectiveness. Also, clinical pharmacists must strive to enhance core competitiveness, improve work quality by establishing standards, and continually gain clinical knowledge and skills to better serve patients in China.

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