

Research on Transformation of Scientific and Technological Achievements for Primary Medical Institutions-based Hospital Alliance

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Abstract Primary medical institutions have been plagued by the contradictory situation of strong creativity and low transformation rate of scientific and technological achievements for a long time in China. In this paper, the status quo of the transformation of scientific and technological achievements in primary medical institutions is analyzed, and the necessity of the transformation of scientific and technological achievements in primary medical institutions is summarized. Further, the realistic paths for the transformation of scientific and technological achievements in the primary medical institutions are proposed. We further point out that it is necessary to transform the scientific and technological achievements of primary medical institutions with the aid of hospital alliance.

Keywords: *primary medical institutions, achievements transformation, hospital alliance, appropriate technology, transformation paths*

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1. Introduction

It is an undeniable fact that China has a low transformation rate of scientific and technological achievements. According to statistics, only 20% of the 30,000 key technological and technological achievements obtained each year are successfully transformed in China, while the transformation rate of medical science achievements is even below 8% [1]. Primary medical institutions take root in clinical practice and the practitioners there have high knowledge level, high professionalism and strong creativity, so they are the suppliers for the transformation of scientific and technological achievements. However, due to limited medical conditions, primary medical institutions also need to introduce new technologies and new methods, so they also serve as the demanders for the transformation of scientific and technological achievements. Yet, as the cornerstone of China's medical security system, the current primary medical institutions are in a very vulnerable position in the transformation of scientific and technological achievements. The hospital alliance, one of the graded diagnosis and treatment service system platforms with the primary medical institutions as the main body [2], not only plays an important role in improving the service ability of primary hospitals, but also has bright prospects in promoting the transformation of primary scientific and technological achievements.

2. The Status Quo of Transformation of Scientific and Technological Achievements in Primary Medical Institutions

At present, large hospitals try to improve the transformation rate of scientific and technological achievements through a variety of means like the cooperation with enterprises. For example, the industry-university-research cooperation in Peking University Medical Industrial Park helps to promote the transformation of scientific and technological achievements; The Innovation Workshop in Xinhua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine assists the clinical doctors with the transformation of their achievements; Ruijin Hospital Affiliated to Shanghai Jiao Tong University School of Medicine has successfully transformed the patent of dormancy; the hospitals affiliated to Harbin Medical University, West China Hospital, the Sixth People's Hospital of Shanghai and Sichuan Provincial People's Hospital have established transformation medicine centers for practice [3-8].

However, as the primary medical institutions generally lack high-end clinical talents and backward medical facilities, their diagnosis and treatment level for diseases is still unsatisfactory. Therefore, it is not an easy thing to promote and implement the innovative medical technological achievements in the primary medical institutions. The diagnosis and treatment level of primary medical institutions cannot satisfy the grass roots' needs of

"visiting the nearest hospital and obtaining substantial benefits", so large hospitals are crowded with patients, primary hospitals have few visitors and people generally flock to the large hospitals. The difficulty of getting medical services has become a social chronic illness. Thus, the transformation of medical science achievements are mainly done by first-class provincial Grade-A hospitals and military hospitals [9,10,11,12]. In contrast, people rarely pay attention to the transformation of scientific and technological achievements in the primary medical institutions, and there are very few reports in this respect.

3. The Necessity of the Transformation of Scientific and Technological Achievements in Primary Medical Institutions

3.1. Primary Medical Institutions – the Demander of Transformation of Scientific and Technological Achievements

Primary medical institutions constitute the basics of China's medical service system. The access of more than 80% of China's population to medical service is through primary medical institutions. The "Chinese dream, a health dream" would degenerate into malarkey without the technical advance of primary medical institutions. The recently issued "The 2014 Summary and 2015 Key Tasks concerning the Deepening of the Medical and Health System Reform" by the State Council put "Graded Diagnosis and Treatment" into the list of key tasks in 2015 and it clearly required the establishment of the First Treatment in Primary Hospitals and Minor Illness Treated in Neighborhood and Major Illness Treated in Large Hospitals. [13] Nevertheless, the primary medical institutions remain so weak that their medical skills and service quality normally fail to meet the requirement of "All Major Illnesses Treated Locally". [2] Primary medical institutions are the key to the improvement of China's medical service quality. The improvement of primary medical institutions is in need of an all-around push carried out through systematic arrangement, policy safeguard and the improvement of service quality. The technical level of medical service, however, is undoubtedly one of the most powerful driving forces, and the application of the transformed scientific and technological achievements of advanced hospitals is proved to be the most useful and effective approach for the improvement of the medical technique level and service level of primary medical institutions. Matured, advanced, safe and appropriate research findings of public goods, the norms and techniques of emergency treatment of critical conditions, people-benefitting medical technical programs, and smart, family-purposed and individualized medical equipment are something that primary medical institutions are running short of, and they can be introduced right after full consideration of technical matureness, appropriateness and safety. As the demander of the transformation of scientific and technological achievements, primary medical institutions have been taking in the research findings of well-known medical institutions on the one hand. On the other hand, they are also attempting to improve their own medical technique

and service level by themselves for the sake of the compliance with the requirements for urban public hospitals during China's medical system reform, as well as the requirements of the Graded Diagnosis and Treatment.

3.2. Primary Medical Institutions - the Suppliers of Transformation of Scientific and Technological Achievements

On the other hand, the clinical-medicine-based primary medical institutions are the supplier of transformation of scientific and technological achievements as well, but they share a weaker awareness of the transformation of scientific and technological achievements than large hospitals. Many creations and inventions are hidden clinically, and those primary medical workers are by no means aware of their potentially great value so they tend to ignore them. As a matter of fact, the creativity of primary medical institutions is not actually worse than their larger counterparts. Unlike large medical institutions which are usually engaged in the research of disease mechanisms, drug screening and gene regulation, they are more inclined to clinical practice and proper medical techniques, apparatuses, and the economic Chinese patent medicines developed by primary medical institutions which are in big numbers. These clinical inventions are normally very practical with low transformation cost, hence they are highly worth spreading. Take the hospital alliance for which the writers of this paper work as an example, it possesses more than 20 patents and all of which are highly clinically valuable medical equipment. But these patents are either being "laid aside" or "secretly" used by creators. This is indeed a waste for primary medical institutions which are already at the bottom, and their situations could be greatly improved if all of these findings can be transformed.

3.3. The Transformation of the Scientific and Technological Achievements of Primary Medical Institutions – A Great Demonstration

Given the circumstance that the transformation level of scientific and technological achievements in China is relatively backward, the transformation of the scientific and technological achievements of primary medical institutions appears to be even more valuable. As the demander and supplier at the same time, primary medical institutions are bound to be a better role model than their larger counterparts if their more down-to-earth findings can be spread. In terms of the transformation, they shall be more confident than larger medical institutions and the only thing they lack is an appropriate way of spreading. The quantitatively bigger primary medical institutions are more closely bound up with the health and happiness of the masses, yet they are lagging far behind larger ones in terms of the transformation of scientific and technological achievements. Statistically speaking, there are over 200 hospital alliances of all sorts in 18 provinces of China today. The joint development and sharing, reciprocating and mutual benefits among all units of the alliance are now the basis for the transformation of scientific and technological achievements of primary medical institutions. Now the samples are sufficient among all hospital alliances and they are also representative for the

demonstration of the transformation of scientific and technological achievements of other primary medical institutions.

4. Thoughts on the Transformation of the Scientific and Technological Achievements of the Primary Medical Institutions-based Hospital Alliances

The main objective of hospital alliance is the implementation of graded diagnosis and treatment. The writers of this paper, however, considered that the reciprocating and mutual cooperation among all members may not be limited in the aspect of graded diagnosis and treatment only, but it shall be conducted in multiple aspects such as medicine, research and education, which is more helpful for the ability upgrade of primary medical institutions and their resources can also be fully utilized. The leading hospitals of an alliance are often medically, academically and educationally stronger, and they are more experienced than other members in terms of the transformation except that they lack a way out in spreading; on the other hand, other members of the alliance have weaker awareness and are less motivated for the transformation of scientific and technological achievements in spite of their resources, and this happens to be the advantage of the hospital alliance. Therefore, the hospital alliance is a great opportunity that primary medical institutions cannot miss. The hospital alliance for which the writers of this paper work has 52 members, among which there are 41 township and village health centers, 9 prefecture-level hospitals and 2 city-level hospitals. The leading members also have an institute of Chinese medicine which is in close relations with intellectual property management companies and manufacturers of medical supplies. These institutions constitute the main subject that demonstrates the transformation of scientific and technological achievements with the help of the knowledge management from intellectual property management companies to expand the channels for transformation with use of this kind of "external aid"; also, the scientific and technological achievements can be put into trial production with the help of the manufacturers of medical supplies, offering support for all members within the alliance.

The transformation of the scientific and technological achievements of the primary-medical-institutions-based hospital alliance shall be reasonably designed to comply with scientific laws instead of blindly following experiences of large hospitals (please refer to fig.1 for the roadmap of how the primary-medical-institutions-based hospital alliance transforms its scientific and technological achievements). The following aspects are included:

4.1. The Transformation Rate of the Scientific and Technological Achievements of Primary Medical Institutions can be Increased with the Aid of the Hospital Alliance

Primary medical institutions are both the demander and supplier of the transformation. But a primary medical institution alone is congenitally deficient in staff,

equipment, information and resources, making it stranded in an extremely passive position. The hospital alliance, however, may put its advantages in resources, as well as in staff, finance and materials to good use for sharing, and develop unified standards and norms for its members in order to increase the efficiency of the transformation and save cost, which are something that primary medical institutions don't have. As the demander, primary medical institutions may give play to the advantage of the hospital alliance in resources, and introduce the technical standard and specification of the diagonal techniques for cardiovascular and cerebrovascular diseases and digestive diseases, the techniques of neighborhood treatment and recovery, the techniques of first-aid and poisoning rescue, the screening techniques of multiple myeloma diseases in the neighborhood, the health-care techniques for women, children and elders in the neighborhood, the prevention and control of common infectious diseases in the neighborhood, health-care education and promotion in the neighborhood centering common diseases and health problems. As the supplier, primary medical institutions have their own features and advantages in Chinese medicine pharmaceuticals and appropriate medical equipment, which are very suitable to be spread and applied in medical institutions of the same level. These sorts of outputs, however, are not widely applied because of the inaccessibility of information, while the hospital alliance, on the other hand, may spread them rapidly with its advantages thanks to information sharing.

4.2. The Mechanism of the Transformation of Scientific and Technological Achievements can be Established by Primary Medical Institutions with the Aid of the Hospital Alliance

A long-term mechanism of the transformation of scientific and technological achievements cannot be established by a weak primary medical institution alone, and the outputs can neither be delivered to the grass-rooted levels, nor can they be delivered from them. The government-oriented transformation cannot cover each and every primary hospital either, and the results are often undesirable. The transformation can be well handled within a certain scope if the advantages of the hospital alliance can be utilized, meaning that the efficiency of the transformation will be increased while the cost will be decreased. This calls for a mechanism accordingly, and the hospital alliance is capable of doing so with its advantages and abilities. Questionnaire survey, Delphi, focused interview and information network can be used for the investigation of the status quo, driving force, needs, attention, influencing factors, difficulties and incentives of the transformation of the scientific and technological achievements among primary medical institutions of which the advantage can be taken by the leading members of the hospital alliance to constantly explore optimal ways and approaches for the transformation, make full use of the market mechanism, effectively integrate the strengths of technical researchers, communicators and applicants for a reasonably deployed essential elements of the transformation, the development of relevant standards, and the formation of the mechanism.

4.3. Relevant Personnel of the Transformation can be Trained by Primary Medical Institutions with the Help of the Hospital Alliance

One of the major difficulties for the transformation of the scientific and technological achievements of primary medical institutions is the lack of qualified people, which is the key problem that limits the transformation, as well as the key factor that causes the "difficulties and high expenses" of China's medical service. As the platform of graded diagnosis and treatment, the leading members of the hospital alliance are in possession of sufficient qualified personnel, and they are more experienced in the transformation than primary medical institutions. These leading members have been bringing advanced ideas, knowledge and scientific and technological achievements to primary hospitals via trainings, promotion of techniques, visits and speeches of all sorts for the constant improvement of primary medical workers. Health-care

techniques are the most critical link for the training of primary medical workers, and they are also the most wanted. The key to the transformation of scientific and technological achievements is the transformation of ideas. The leading members of the hospital alliance may establish a variety of academic platforms such as the union of specialist physicians and medical salons to strengthen the academic communication and collaboration among members. During the process, the technique supplier enhances its ability in teaching, and the recipient of techniques expanded its abilities and knowledge. That's how the hospital alliance becomes the platform for the training of qualified personnel.

4.4. The Safeguard Mechanism of the Transformation of Scientific and Technological Achievements can be Established by Primary Medical Institutions with the Aid of the Hospital Alliance

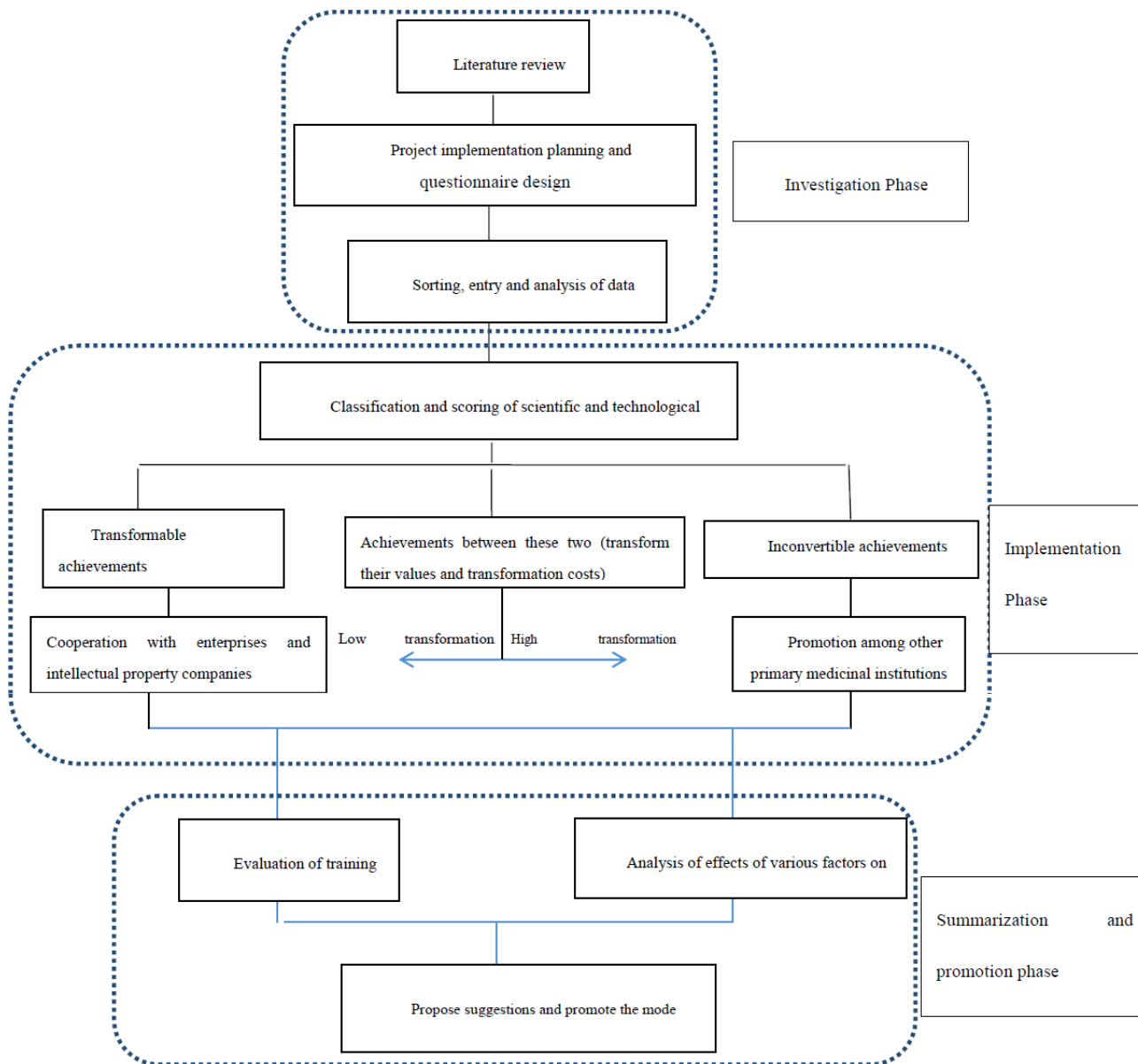


Figure 1. The roadmap on how the primary-medical-institutions-based hospital alliance transforms its scientific and technological achievements

The transformation of scientific and technological achievements requires investments from multiple parties

and the support of both software and hardware facilities, for this is the only way that the transformation can be

orderly processed. The hospital alliance may give play to the collective advantage of its members for the safeguard of the transformation such as the perfection of the information platform for resources sharing, so that the transformation can be processed in a healthy way; and the strengthening of communication and interaction inside the hospital alliance for the exploration of a long-term mechanism, like sending delegation to other cities or countries, the hosting of skill contest, and communication event to enhance the success rate of the transformation; also the study of remote treatment, such as the technical training of remote treatment via cellphone, so that the efficiency of the transformation of medical techniques can be increased; and finally, the founding of house journals so that the hospital alliance can be more united, the communication among members can be strengthened, and the freshness and the sense of accomplishment of the transformation can be safeguarded.

5. Conclusions

In the context of new healthcare reform with "reinforcing the medical foundation, safeguarding the primary hospitals and establishing reasonable mechanisms" as the principles, the status quo of the transformation of scientific and technological achievements in primary medical institutions is investigated. The primary medical institution-based hospital alliance and the transformation paths are explored for the transformation of transformation of scientific and technological achievements in these institutions. It is concluded that to establish a primary medical institution-based hospital alliance is a realistic choice for the transformation of scientific and technological achievements. In the transformation practices of scientific and technological achievements in primary medical institutions, it is of great significance for us to explore the talent accumulation, platform construction and system establishment and gradually form a complete set of scientific and technological achievements transformation system so as to better serve China's medical industry. By transforming the scientific and technological achievements of primary medical institutions, we can arouse these institutions' enthusiasm for transformation of scientific and technological achievements, which is practical and feasible for the exploration of an effective mechanism, the establishment of a demonstration platform and the cultivation of relevant talents for such transformation as well as the improvement of scientific research level and medical service ability of primary medical institutions.

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