

Enlightenment of a Comparative Study on Rehabilitation Education between China and Japan

Qingcheng Guo^{1,2}, Lihua Zhang¹, Zhijiao Fan³, Xinxin Ma², Yu He², Xinan Zhang⁴, Yubao Ma^{1,2*}

¹Department of Musculoskeletal Rehabilitation, Capital Medical University, Beijing, China; ²Department of Beijing Rehabilitation Medicine, Capital Medical University, Beijing, China; ³Department of Rehabilitation Treatment, Capital Medical University, Beijing, China; ⁴Department of Kinesiology, Shenyang Sport University, Shenyang Liaoning, China

ABSTRACT

With the improvement of the medical level, rehabilitation plays an increasingly important role in the medical system. To further strengthen education in the future rehabilitation industry, the current situation of rehabilitation education program in China and Japan is hereby compared. This paper compares the differences between China and Japan based on the elements of the training mode, including training objectives, training regulation, qualification recognition, theoretical curriculum and clinical practice. It is found that there are still deficiencies in rehabilitation education in China, such as a lack of uniform regulations, confusion of training objectives and unclear sub-disciplines, which need to be improved. This study summarizes the possible direction for China's promotion of therapist education, thereby providing a reference for the enhancement of rehabilitation education in China and other countries.

Keywords: China; Japan; Rehabilitation; Comparative education; Physical therapy; Occupational therapy

INTRODUCTION

Rehabilitation is an indispensable part of national health services, and its main branches include Physical Therapy (PT), Occupational Therapy (OT) and Speech Therapy (ST). Improving the quality of education for rehabilitation therapists is of considerable value to promote the development of rehabilitation. Undergraduate rehabilitation education in mainland China started in 2001. With the emphasis on the importance of rehabilitation in the Plan of Health China 2030 in 2016 and the increasing aging society, the demand for therapists is increasing [1,2]. To satisfy the huge social needs, more rehabilitation majors are being established in colleges and universities, but the education quality still needs to be improved [3]. Japan has relatively complete rehabilitation program in Asia with a history of nearly a hundred years and its rehabilitation industry is still developing rapidly [4,5]. Compared with China, the demographic structure in Japan is also accompanied by a serious problem of aging. In 2013, the proportion of the elderly population (≥ 65 years old) in Japan reached 25% [6]. In China, it is predicted that, by 2035, the population over 65 years will make up 25% of the total population [7]. In this case, analysing the training system in Japan and fully absorbing its strongpoint

will be of great significance in promoting the development of rehabilitation careers in China and other countries. However, in the field of rehabilitation, comparative studies between China and Japan are still inadequate, which manifests the necessity of carrying out this research.

LITERATURE REVIEW

Training objectives

Training objectives in China: There are a large number of vacancies for therapists in China. National survey data reveal that the total number of rehabilitation therapists in China was 1.4 million in 2009; that is, there is only one therapist for every 1,000 people [8]. Based on this, the training objectives should be to cultivate therapists with comprehensive rehabilitation skills to fill the vacancies. The Research Group of the Chinese Association of Rehabilitation Medicine has clearly stated in the Education Standards for Undergraduate Rehabilitation Therapy [9] that the training objective is to ensure students' overall development. Students should master basic rehabilitation therapy knowledge and techniques and be able to engage in different branches of rehabilitation departments in various medical institutions.

Correspondence to: Yubao Ma, Department of Musculoskeletal Rehabilitation, Capital Medical University, Beijing, China, Tel: +8610-56981089; E-mail: myb-sreha@ccmu.edu.cn

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In addition, it also recommends that students should master physical factor therapy, occupational therapy, Chinese medicine rehabilitation, and speech therapy, the very aim of which is to foster multidisciplinary personnel to meet the urgent needs of society.

Training objectives in Japan: Considering the detailed division of PT, OT, and ST in undergraduate education in Japan, the training objectives here are more focused on the specialty of the rehabilitation subfield. The Education Guide (Version 0) introduced in 2009 clearly states that the training objectives of pre-graduate therapists are to develop basic knowledge and skills specific to their field and develop their independent learning capability [10]. In this case, compared to the needs for comprehensive therapists in China, Japan sets up more detailed delineated disciplines and places more emphasis on the depth and refinement in the training process.

Conclusion: In China, due to the huge demand for human resources [11], more emphasis is placed on the overall competence of the student, highlighting the breadth of knowledge instead of the depth. The aim is to prepare students for employment in a variety of institutions and different rehabilitation departments. However, in Japan, the education focus is to training students' specialties in the rehabilitation subfield, which has a strong relevance to the social context of the early establishment of rehabilitation education and the abundant social resources in this field. In general, the training objective in China is to rapidly expand the number of therapists, while in Japan, the aim is to improve the quality of therapists, resulting in differences in the training objectives.

Training regulation and qualification recognition

Training regulation and qualification recognition in China: Undergraduate education in rehabilitation therapy in China started in 2001, when the Ministry of Education of the People's Republic of China first specified the name "rehabilitation therapy" in the List of Undergraduate Majors of Higher Education Institutions [12]. As of 2018, the number of colleges and universities offering this major had reached 174 [13]. However, there still lacks a corresponding regulation to unify the education program in China. Although most institutions conform to the previously mentioned Standards for the Undergraduate Rehabilitation Education Programs [9], each institution still has the autonomy to arrange its own curriculum system, which leads to some variations across different institutions. Some institutions have also adapted to the international standards of the World Confederation for Physical Therapy (WCPT) and the World Federation of Occupational Therapists (WFOT). Likewise, there is also a lack of qualification recognition for therapists after graduation. China relies mainly on the national examination of health professionals and technical qualifications organized by the Ministry of Human Resources and the Ministry of Health for recognition [14], which classifies therapists into three levels: junior therapist, intermediate therapist, and advanced therapist. Academic qualifications and years of work experience are the main requirements for registering for this examination. For example, therapists with a doctorate degree are immediately eligible for the advanced examination, while those who graduate

from secondary technical school are required to have at least 7 years of working experience to attend the exam.

Training regulation and qualification recognition in Japan: Different from China, the rehabilitation education program was established earlier in Japan in 1925, when Kenji Takagi founded the Japan Association for the Welfare of Physically Unstable Children [15]. The regulation unifying rehabilitation education is the Rules for the Training and Education of Physiotherapists and Occupational Therapists established by the Ministry of Health, Labour and Welfare [16]. Every institution is required to comply with this regulation that specifies the courses to be taught and the corresponding credits of each course. This regulation was first introduced in 1966, since then, it has been revised four times. In the first revision in 1972, the number of teaching hours was reduced for the clinical basis and increased for the rehabilitation basis. The second revision in 1989 aimed at making the training system more responsive to the needs of society and preparing for the intensifying process of population ageing. The third revision in 1999 gave schools the scope to develop different rehabilitation programs. The current version, revised in 2018, focuses more on clinical practice and further discusses the assessment of preclinical and post-clinical training. In brief, although the curriculum is absolutely limited by the rules, the rules are not rigid. Instead, they are flexible and adapt to the needs of society.

In terms of evaluation for graduates, their skills are assessed through the National Examination for Rehabilitation Therapists, divided into the National Examination for Physical Therapy and the National Examination for Occupational Therapy. The exam defines the range of knowledge that therapists must master, and the passing rate is maintained at approximately 90%. Regulated qualifications guarantee the professional competence of therapists, and such examinations are internationally acknowledged.

Conclusions: In terms of training regulation, although there are certain standards in China for reference, clear regulations are still needed, while Japan, on the other hand, has relatively standardized rules to ensure the quality of rehabilitation education. Both China and Japan have matured national examinations as training evaluations. China's national examination takes graduates' educational background and working years as the requirement for registration, which is not only an assessment of undergraduates but also a step-by-step ability classification for all therapists. However, the National Examination in Japan, divided into the National Examination for Physiotherapy and the National Examination for Occupational Therapy, focuses more on testing the competence of graduates to ensure a basic competence.

CURRICULUM SYSTEM

Curriculum system in China

Theoretical curriculum system: In China, the theoretical curriculum system is divided into three general sections: General foundation requisite, subject foundation requisite and subject area requirement. The corresponding content is also described in Standards for the Undergraduate Rehabilitation Education Programs [9], including medical physics, human anatomy, physiology, pathology, human kinesiology, community medicine, medical psychology, general clinical medicine (neurology,

orthopaedics, internal medicine, paediatrics), traditional Chinese medicine rehabilitation therapy, physical factor therapy, speech therapy [9], etc. The general foundation requisite mainly contains compulsory courses for higher education in China, such as physical education, and introduction to the basic principles of Marxism; the subject foundation requisite mainly includes clinical foundation courses, such as systematic anatomy; and the subject area requirement mainly includes physical therapy assessment, clinical occupational therapy and other rehabilitation-related content. In China, teaching hours are generally equally allocated to general foundation requisite, subject foundation requisite and subject area requirement, among which more teaching hours are allocated to the general foundation requisite than to the former two, as shown in Table 1. Subject foundation requisite and subject area requirement account for almost the same proportion, suggesting the existence of excessive clinical basis courses for therapists but insufficient rehabilitation courses (Table 1).

Arrangement for clinical practice: At present, two main clinical teaching mode of rehabilitation therapy is segmented practice and centralized practice. The centralized practice mode is widely used in China, which separates clinical practice from theoretical teaching. Within a full senior year, the students are arranged to rotate in various departments of rehabilitation, covering most of the subdiscipline of rehabilitation. Students operate under the supervision and guidance of the superior therapist. For example, the PT direction internship arrangement in Capital Medical University is as follows: Rehabilitation Assessment Department (4 weeks), Prosthetic and Orthopaedic Department (2 weeks), Speech Rehabilitation Department (4 weeks), Traditional Chinese Medicine Rehabilitation Department (2 weeks), Therapeutic Exercise Department (20 weeks), Physical Factor Therapy Department (4 weeks), Community Based Rehabilitation Department (1 week), and Occupational Therapy

Department (4 weeks).

Curriculum system in Japan

Theoretical curriculum system: Currently, the theoretical curriculum system of rehabilitation specialties in Japanese universities is mainly carried out following the Rules for the Training and Education of Physiotherapists and Occupational Therapists [16], and the curriculum is similarly divided into basic areas, professional basic areas, and professional core areas. The Education Guide (Version 0) published in 2009 provides detailed examples of the corresponding courses for each section. Basic areas include medical ethics, team medical and so on, and the contents of anatomy, physiology, and kinematics are illustrated for the part of human structure and development in the section of professional foundation. The part of diseases and disability includes more detailed content, such as mental disorders, bone and joint disorders, neuromuscular disorders, developmental disorders in children, and elderly disorders [10], accompanied by health care, welfare and medical basis. Professional core areas include physical/occupational therapy assessment and community physical/occupational therapy. Table 2 illustrates the curriculum arrangement of physical therapy at Kyoto University, which reflects the implementation of the rules. The credit calculation standard is as follows: for lectures and trainees, 15–30 hours equal 1 credit, while for clinical practice, 45 hours equals 1 credit [17]. Professional core areas account for 56 percent of the total teaching hours, professional basic areas account for 30 percent, and basic areas account for only 14 percent. It can be clearly found that the teaching hours in the professional core areas and the professional foundation area are significantly more than those in basic areas, fully indicating that the focus of the curriculum system is more concentrated on professional rehabilitation knowledge (Tables 2 and 3).

Table 1: Teaching hours allocation of physical therapy direction in Capital Medical University and Nanjing Medical University.

University	Subject foundation requisite	Subject area requirement	General foundation requisite	Total
Capital Medical University	702 (25%)	920 (30%)	1342 (45%)	2982
Nanjing Medical University	1008 (32%)	891 (29%)	1214 (39%)	3113

Table 2: Curriculum of Physical Therapy in Capital Medical University and Kyoto University

Academic Year	Capital Medical University	Kyoto University
First academic year	Human Anatomy B; Histology and Embryology B; Human Body Morphology B; Medical Chemistry A; Medical Physics B; Physiology A; Biochemistry C; Medical Statistics C; Medical Ethics A; Biomechanics C; Introduction to rehabilitation; Human Development; Medical Biology Experiment B; Computer Base B; Acquisition and Processing of Medical Literature	General Theory of Physical Therapy; Physical Therapy Trainee
Second academic year	Kinematics; Medical Experiment C; Abnormal Human Morphology Experiment C; Database B; Internal Medicine; Surgery (orthopedic surgery); Pediatrics; Diagnostics; Psychiatry B; Neurology; Rehabilitation ideological education; Pathophysiology B; Pathology C; Medical psychology A	Physical Therapy Assessment; Physical Therapy of Musculoskeletal System; Prosthetic; Daily Life Assistance Law I

Third academic year	Gerontology; Professional English for Rehabilitation Therapy; Chinese Traditional Rehabilitation Therapy; Rehabilitation Psychology; Introduction to Community Rehabilitation; Adaptive Sports and Recreational Therapy; Speech therapy; Physical Factor Therapy; The Technology of Therapeutic Exercises; Evaluation and Assessment For Rehabilitation Therapy; Basic of Occupational Therapy; Introduction to Occupational Therapy; Therapeutic Exercise Clinical Application; ADL Skills and Environmental Adaptations(PT); Prosthetic and Orthopedic (PT); Occupational Therapy Research (PT); Community Physical Therapy; Physical Therapy Research; Occupational Therapy	Physical Therapy Assessment; Clinical kinesiology; Physical Therapy of Musculoskeletal System; Neurophysical Therapy; Physical Therapy of Sports Injury; Physical Therapy of Developmental Disorders; Physical Factor Therapy; Activities of Daily Living Science; Orthopaedics; Physical Therapy For the Elderly; Daily Life Assistance Law II; Introduction to Community Physical Therapy; Physical Therapy of Respiratory System; Physical Therapy of Circulatory Metabolic System
Fourth academic year	clinical practice	Sports Skills and Anatomy Seminar; Sports Anatomy Seminar; Graduation Research; Case Discussion Seminar; Physical Therapy; Medicalimageology Diagnosis; Plastic Surgery Seminar

Table 3: Theoretical curriculum system in Japan (revised 2018) [15].

	Curriculum	Credits
Basic fields	Scientific methodology	14
	People and life	-
	Subtotal	14
Professional basic fields	Human structure and development	12
	The composition and recovery process of diseases and disability	14
891 (29%)	Health care welfare and rehabilitation concept	4
	Subtotal	
Professional core fields	Basic occupational/physical therapy	6
	Physical/occupational therapy assessment	6
	Occupational/physical therapy	20
	Community occupational/physical therapy	3
	Occupational/physical therapy management	2
	Clinical practice	20
	Subtotal	57
	Total	101

Arrangement for clinical practice: The Education Guide (Version 0) specifies the objectives of clinical practice, which are to develop the clinical observation and analysis ability to meet the diverse needs of society, to master the ability to formulate treatment plans and to carry out rehabilitation therapy for various disabilities and age groups [10]. This confirms that the goal is to enable students to complete rehabilitation work independently. The practice mode in Japan is segmented practice, which is setting up a period of clinical practice every year for four years, but the length of each internship is different. Although it is divided into four years, the content of clinical practice is consistent, and the difficulty is progressive year by year with theoretical teaching. For example, internship practices in chronological order at the International University of Health and Welfare include trainee, inspections and assessments, assessments and clinical practice [13]. At the same time, in theory teaching, some courses adopt the feedback teaching mode, which means a subject being taught repeatedly according to students' feedback in several academic years, but the difficulty and focus are different. Theoretical courses and segmented practice jointly ensure the improvement of clinical skills as well as students' understanding and memory of knowledge.

Conclusions: In China, theoretical curriculum is divided into three sections; general foundation requisite, subject foundation requisite and subject area requirement. In Japan, the curriculum is divided into three sections, basic fields, professional basic fields and professional core field. Although the name sounds different, their general meaning remains similar. The difference lies in the proportion of each section. The basic fields in Japan is significantly less than the other two sections, while in China, the proportion of general foundation requisite is much more than that of the other two parts, which may be attributed to the fact that the general foundation requisite also includes Chinese college students' compulsory courses. In Japan, similar courses are not included in the Rules for the Training and Education of Physiotherapists and Occupational Therapists [15], as shown in Table 2.

Additionally, there are more medical basis courses, such as histology, embryology and biochemistry in China. More medical courses make the training mode of rehabilitation therapists close to that of rehabilitation physicians and lead to insufficient content in rehabilitation professional courses compared with Japan, indicating the confusion in the training objectives in China. Compared with China's curriculum, Japan's curriculum has the following characteristics:

- The teaching content in Japan has a clear division of PT and OT. Freshmen have access to rehabilitation courses and only a few clinical basis courses;
- In the training process, the concept of the International Classification of Functioning (ICF) is further strengthened to cultivate students' ability to solve the problems of patients' social participation [18];
- Japan carries out feedback teaching on some key teaching content. This teaching method is complementary to the segmented practice.

It has been found that the motive for learning is related not only to theoretical learning but also to the internship [19]. The main distinction of clinical practice in China and Japan is the difference between centralized practice and segmented practice, each provided with its own advantages and disadvantages. The centralized practice in China is beneficial for students to establish complete clinical thought and fully grasp the complete system from assessment to treatment. However, in centralized practice, clinical practice and theory teaching are completely separated, which is more likely to cause the disconnection of clinic and theory. If students do not have enough autonomy to consolidate basic knowledge, it is extremely easy to enter the bad state of lacking critical thinking and reflection.

Segmented practice is more conducive for students to gradually consolidate their theoretical knowledge in clinical practice. In the internship after each school year, students can get the opportunity to apply the theoretical knowledge they have learned into practice and get it closely combined with clinical practice. However, considering the limited knowledge reserve of students in the early stage of their undergraduate study, this internship will not only increase the working pressure of clinical teachers but also reduce patients' satisfaction. In summary, the teaching cost of segmented practice is higher, and it also puts forward higher requirements for teachers.

DISCUSSION

Directions for curriculum improvement

Clarify the cultivation target: First, it is necessary to clarify that the training objective is not to cultivate rehabilitation physicians but rehabilitation therapists instead. For the cultivation of rehabilitation therapists, colleges are recommended to focus on teaching manipulation, rehabilitation assessment and other unique techniques. However, in some colleges and universities, medical basis courses occupy too many course hours, making therapists learn a large number of overlapping courses with rehabilitation physicians. Excessive medical basis courses not only cause great academic pressure on students but also reduce the class hours of rehabilitation courses so that both the depth and breadth of the students' rehabilitation study are insufficient. It may thereby lead to a shortage of professional competence of therapists, indicating the confusion of training objective. The focus point needs to be further adjusted and clarified.

Employment-oriented training mode

In the early stage of rehabilitation development, a large number of vacancies led China to focus on training multi-skilled therapists to quickly solve social needs. However, in recent years, there has been an initial development of rehabilitation in China. Tao et al. concluded that 72.9% of rehabilitation institutions expressed a demand for universities to establish separate majors of PT, OT and ST, and 62.2% suggested that the training mode should be further classified according to adult rehabilitation and child rehabilitation [20]. The data showed that compared with multi-skilled therapists, institutions prefer therapists with refined and specialized skills. In view of the present situation, it is not only the divisions of PT and OT that needs to be solved in the future; the rehabilitation training direction can also be divided more

detailed. Additionally, specialized courses are also conducive to improving academic motivation and strengthening the learning effect of students [21,22].

Improving training - certification system in rehabilitation field

For undergraduate training, although relevant guidance has been put forward for the training of therapists in China, there is still a lack of specified standards, resulting in uneven teaching quality. Unified regulations should be introduced to unify the overall curriculum content and the selection of teaching materials to ensure the quality of therapists in China. Furthermore, the certification system of rehabilitation therapists should be improved. In addition to the existing general identification of junior therapists, intermediate therapists and advanced therapists, the certification system should be further divided by rehabilitation sub-specialties. Along the undergraduate training to the authorization of graduation certification, enough attention should also be given to make the therapist training chain more standardized and complete

Matching the trend of the combination of rehabilitation and elderly care

With the change in demographic structure, the proportion of people aged ≥ 75 years in mainland China accounts for 18.7% of the total population [23]. In this case, there is a great social demand for elderly rehabilitation, but the elderly services industry is still in its infancy in China. In view of the current situation, rehabilitation education should also be changed in response to social needs. The proportion of geriatric related content in the curriculum should be increased. To solve the contradiction between the great rehabilitation needs of the elderly and the limited and concentrated rehabilitation resources, rehabilitation services should further change from "hospital-centred medical care" to "community-oriented medical care", and home health care should be enhanced [24,25]. Therefore, therapists are required to be prepared with capacity of community rehabilitation to ensure the effective implementation of the combination of rehabilitation and elderly care.

Localization of rehabilitation education

Rehabilitation is an emerging industry in China and has not arisen enough awareness [26]. Work colleagues and patients have a weak understanding of importance of therapists, resulting in low status of therapists and greatly reducing career satisfaction [27], making it necessary to improve the social recognition of rehabilitation. In addition to regulating the rehabilitation industry, it is also crucial to localize it so that the public will be more open to the trend of rehabilitation stepping into their lives. The development of rehabilitation education requires not only the continuous advanced knowledge and techniques but also adaptation to the needs of residents.

CONCLUSION

Based on the elements of training mode, rehabilitation education between China and Japan is hereby compared. In terms of training objectives, China focuses on cultivating comprehensive therapists while Japan emphasizes cultivating specialized therapists. In terms of training regulation, compared to the

clear rules and regulations in Japan, there is still a lack of precise regulations in China to unify educational activities. At the same time, the curriculum system in China has given more attention to medical basis courses but less attention to rehabilitation courses, which makes the training mode closer to that for rehabilitation physicians. However, there are still some limitations in this study. Due to the lack of a unified curriculum standard in China, the Standards for the Undergraduate Rehabilitation Education Programs with relatively large reference value is compared with the Rules for the Training and Education of Physiotherapists and Occupational Therapists in Japan. However, the rehabilitation program in every institution has not been set up in exactly this way, thereby making the comparison insufficient. Index with a higher-level reliability in both China and Japan should be explored for further comparison in subsequent studies.

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CONFLICTS OF INTEREST

All authors declare that there is no conflict of interest.

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AUTHOR CONTRIBUTION

Qingcheng Guo implemented the study, collected the data and wrote the main manuscript text. Yubao Ma conceived and designed the experiments and guided the manuscript revision. Lihua Zhang, Zhijiao Fan, Xinxin Ma and Yu He revised manuscript and provided technical and material support. Xinan Zhang critically reviewed the article for intellectual content. All authors reviewed the manuscript.

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