

SPECIAL REPORT

REHABILITATION RESEARCH IN CHINA AND JAPAN

Masami Akai,¹ Meigen Liu,² Zong-Yao Wu³ and Tiecheng Guo⁴

From the ¹Department of Rehabilitation for Movement Functions, Research Institute, National Rehabilitation Center, Tokorozawa, Japan, ²Department of Rehabilitation Medicine, Keio University School of Medicine, Tokyo, Japan, ³Department of Physical Medicine and Rehabilitation, Southwest Hospital, The Third Military Medical University, Chongqing, China and ⁴Department of Rehabilitation Medicine, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China

Objective: Despite recent developments in global communication networks in medicine, researchers whose first language is not English are confronted by a dilemma; international demand to publish their works in English as the *de facto* common language and domestic needs to maintain a high level of research activity. To facilitate more contributions by non-English speaking researchers we reviewed rehabilitation research in China and Japan.

Design and methods: The review was conducted by investigating 4 Chinese journals and the Japanese journal on rehabilitation medicine (1997/1999–2001), financial information from the proceedings of the Annual Congress of the Chinese Society (2000–02) and government grants given for research in Japan (1998–2000).

Results: In China, half of the articles focused on the effects of physical modality and therapeutic exercise on normal subjects. Most funds came from a Natural Science Foundation run by the central government. The Japanese journal contained a small number of clinical trials and many experimental studies. The number of applications for government grants increased.

Conclusion: Though rehabilitation research is a relatively young branch of medical science, research in both China and Japan has been increasing. In the future we should organize clinical research to satisfy the needs of specific socio-economic backgrounds and overcome the dilemma between global and domestic activities.

Key words: research trend, grant, journal, China, Japan.

J Rehabil Med 2004; 36: 145–152

Correspondence address: Masami Akai, Department of Rehabilitation for Movement Functions, Research Institute, National Rehabilitation Center for Persons with Disabilities, 4-1 Namiki, Tokorozawa, Saitama 359-8555, Japan. E-mail: akai@rehab.go.jp

Submitted September 30, 2003; accepted December 16, 2003

INTRODUCTION

Recent developments in computer systems and rapid progress in information technology have brought us global communication

networks and online electronic data sources. This powerful combination of computer technology and databases in English, as the common language of communication, is now regarded as the established global system for medical information exchange. The situation is good for rehabilitation medicine, which is a relatively young medical field. However, can this *de facto* global standard apply to real local circumstances? We need to find out about real local situations and adjust the global standard by fine-tuning it to meet the specific conditions of countries concealed behind the problem of accessibility, especially non-English speaking countries.

The 30th anniversary of the re-establishment of diplomatic relations between China and Japan occurred in 2002. In this memorable year a delegate from the Japanese Association of Rehabilitation Medicine visited Beijing to attend the China–Japan Medical Conference 2002. At this conference 40 papers and posters were presented during the session on rehabilitation medicine. These reports were pertinent for information exchange between China and Japan concerning rehabilitation medicine. Rehabilitation science is a new specialty of medical research in both countries, but it has increasing importance as the socio-economic system rapidly develops in China, as the ageing of society progresses and as disease structure changes dramatically in both countries.

This article was originally produced by combining the papers presented at that conference with additional data on rehabilitation research in China and Japan. The authors of this paper work on the editorial boards of either the Chinese Society of Physical Medicine and Rehabilitation or the Japanese Association of Rehabilitation Medicine. This article reports on the academic activities, productivity and pressing questions concerning these 2 societies in the field of rehabilitation medicine.

China

The modern concept of rehabilitation was introduced into China in the early 1980s. Up to the present time, there has been no standard resident training program for rehabilitation medicine outside of the 15–20 programs for postgraduate training in China. China has just recently begun a nationwide certification system for attending physiatrists. No official statistics are currently available on how many physiatrists there are at present

in China, although the estimated number is 10 000. However, no more than 30% were found to be well qualified and able to meet international standards. The best physiatrists serve at 100 medical colleges or general hospitals at the province level or in army hospitals where most research is completed.

Japan

The Japanese academic society entrusted with rehabilitation medicine, the Japanese Association of Rehabilitation Medicine, was founded in 1963. The number of active members was 9447 in 2002. The number of registered expert doctors engaged in other specialties, such as orthopaedics or neurology, who also participated in rehabilitation medicine after examination (board-certified members of rehabilitation medicine) was 4887, and the number of board-certified specialists in rehabilitation medicine (physiatrists) was 807. The past 8 years has seen a progressive increase in certified specialists. The population of researchers and teaching staff has increased to more than 2000 and there has been an abundance of related journal publishing and meetings.

DATA COLLECTION

In order to delineate the current status of research activity in rehabilitation medicine, we used a method called “narrative review” to examine the trends in up-to-date research in China and Japan. Basic methods for categorization in “topics according to diagnostic groups” or “topics according to methods used” were originally used at the China–Japan Medical Conference 2002 by 1 of the Japanese authors (MA). Following that categorization the Chinese authors conducted their investigation.

China

There is as yet no unified academic society for rehabilitation medicine in China. The Chinese Society of Physical Medicine and Rehabilitation is the only organization of physiatrists in China at present. Members of this society are physiatrists only. The leaders of this society are professors in medical schools and deal with teaching, research and clinical practice. However, most members are involved in clinical practice and are not engaged in research or teaching. The members of the Chinese Association of Rehabilitation Medicine include doctors, therapists, nurses and other medical practitioners who are interested in rehabilitation. Among the doctors, the majority are physiatrists, but there are also many orthopaedic and general surgeons, and neurologists.

There are widely available 8 different rehabilitation journals in China. The authors chose the following 4 journals for the present analysis: (i) the *Chinese Journal of Physical Medicine and Rehabilitation* (formerly the *Chinese Journal of Physical Medicine*) sponsored by the Chinese Society of Physical Medicine and Rehabilitation since 1979; (ii) the *Chinese Journal of Physical Therapy* sponsored by the Chinese Society of Physical Medicine and Rehabilitation since 1978; (iii) the *Chinese Journal of Rehabilitation Medicine* sponsored by the

Chinese Association of Rehabilitation Medicine since 1986; and (iv) the *Chinese Journal of Rehabilitation Theory and Practice* sponsored by the China Rehabilitation Research Center since 1995.

The *Chinese Journal of Physical Medicine* changed its name to the *Chinese Journal of Physical Medicine and Rehabilitation* in 1999, and the *Chinese Journal of Physical Therapy* was integrated into the *Chinese Journal of Physical Medicine and Rehabilitation* in 2002. The titles, abstracts and key words of the original papers were provided both in Chinese and English in these journals.

The Chinese authors analysed the papers from the 4 Chinese journals for the years 1997–2001. The journals were published monthly and approximately 15 000 copies per issue were distributed in total. They also analysed information from the proceedings of the Chinese Society of Physical Medicine and Rehabilitation for 3 years (2000–02). There were 1–3 national congresses on rehabilitation medicine – each sponsored by a different society or committee every year – with 100–300 participants at each one. Most of these congresses published their proceedings with around 200 papers.

The Chinese authors were not aware of any official information on the number of grants for each topic or the total amount of these grants. However, they did know that the grant amounts varied for different kinds of research. They analysed the topics published in these 4 journals and the footnotes to gather information about their origins of financial support. The data they examined were limited to those 5 years, but reflected in general the actual activity in rehabilitation research in China.

Japan

The association has published the *Japanese Journal of Rehabilitation Medicine* since 1963, and each month distributes approximately 9800 copies, mainly in Japan. Supplementary proceedings of the annual meeting are also published once a year. The titles, abstracts and key words are provided both in Japanese and English. However, the text itself is written in Japanese only.

The data source for the journal analysis was based on the official journal of the Japanese Association of Rehabilitation Medicine over 3 years (1999–2001).

The 7 ministries of the Japanese government provided funds for scientific research and the amount of competitive grants totalled 2.5 billion Euros (320 billion yen) in 2002. In the biomedical field there were 2 main grants from the Ministry of Education, Science and Technology and the Ministry of Health, Labor and Welfare. Many private grants were also available. The largest government grant for science research in Japan was the former, “Grant-in-Aid for Scientific Research” from the Japan Society for the Promotion of Science, which was managed through the Ministry of Education, Science and Technology. These systems were basically a competitive fund, but some parts of the grants were unequally furnished according to governmental policy (especially the latter). The sum of the Grants-in-Aid was 1.0 billion Euros (135 billion yen) in 2000, and

1.3 billion Euros (170 billion yen) in 2002. The annual growth rate compared with that of the previous year for the last 8 years ranged between 8% and 12%. As for grants, we focused on the application forms for Grants-in-Aid from 1998 to 2000.

Before 1997 there was no special category for rehabilitation science that qualified for Grants-in-Aid, thus many applications from rehabilitation medicine were made to other categories. Our association pursued a campaign to gain a specific category solely for Grants-in-Aid for rehabilitation science. Rehabilitation science was then taken up as a temporary Grants-in-Aid category for 3 years (from 1998 to 2000). After this 3 years' temporary assignment we were given a specific category for rehabilitation science. At that time the Japanese Association of Rehabilitation Medicine collected the application forms for Grants-in-Aid (for 1998–2000) from 60 medical faculties (medicine and health science) to appeal the actual situation of our activities. The authors analysed both the content and adopted result of these application forms.

RESULTS

Journals in China

The Chinese journals on physical and rehabilitation medicine have improved quickly. They began publishing quarterly and changed to bimonthly and then monthly, and presently even twice per month for some. The 4 listed journals are published monthly at the present. Each issue of each journal consists of about 60 pages and 30–40 articles, which can be categorized as original papers (including basic science research and clinical research), brief reports, case reports, reviews or forums. They are shown in Fig. 1A.

Data on topics that have appeared in the journals according to diagnostic group are shown in Fig. 2A. The main diseases reported were cerebrovascular accident (CVA) and traumatic brain injury (TBI). A large proportion of the articles (approximately a quarter) concerned other issues (modality and exercise therapy mainly).

Figure 3A shows data on topics that have appeared in the journals according to the method used. Half of the papers reported the use of traction, acupuncture, Chinese traditional massage (tuina) and physical modality, all of which were commonly used interventions practised by Chinese rehabilitation professionals. In particular traction, acupuncture and Chinese traditional massage were used in almost every rehabilitation medicine unit in their daily practice. But in journals or proceedings only 4% of the papers involved topics related to acupuncture and tuina, and only 2.2% involved topics related to traction. Approximately 7.8% of the papers involved topics related to medicine therapy. But few of them were related to Chinese traditional medicine. Herbs were used in some clinics but not reported on in rehabilitation journals or proceedings. They might be reported on in journals for Chinese traditional medicine.

Figure 4A shows the topics presented at the proceedings of the Chinese Society of Physical Medicine and Rehabilitation over

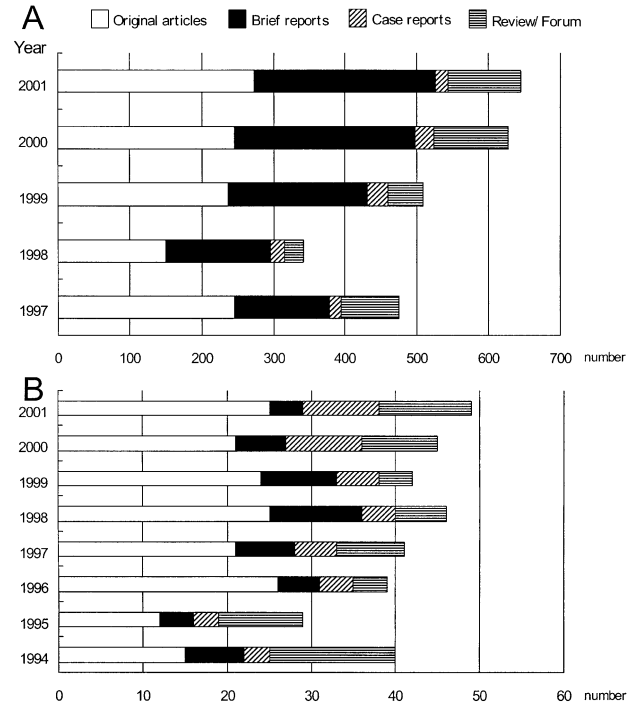


Fig. 1. Article types in 4 Chinese Journals (A) and in the Japanese official journal (B).

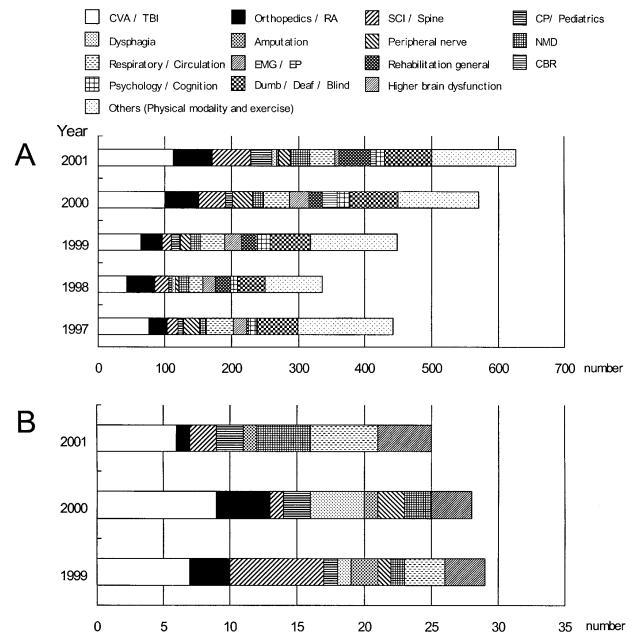


Fig. 2. Topics in 4 Chinese journals (A) and in the Japanese official journal (B) according to diagnostic group. CVA = cerebrovascular accident; TBI = traumatic brain injury; SCI = spinal cord injury; CP = cerebral palsy; CBR = community-based rehabilitation; NMD = neuromuscular disease; RA = rheumatoid arthritis.

the last 3 years. These were different from those found in the journal, as more articles focused on CVA, TBI, spinal cord injury (SCI), spine, bone and joint (60.6% vs 31.3%) and less on others (18.7% vs 25.1%). That is because more attention has

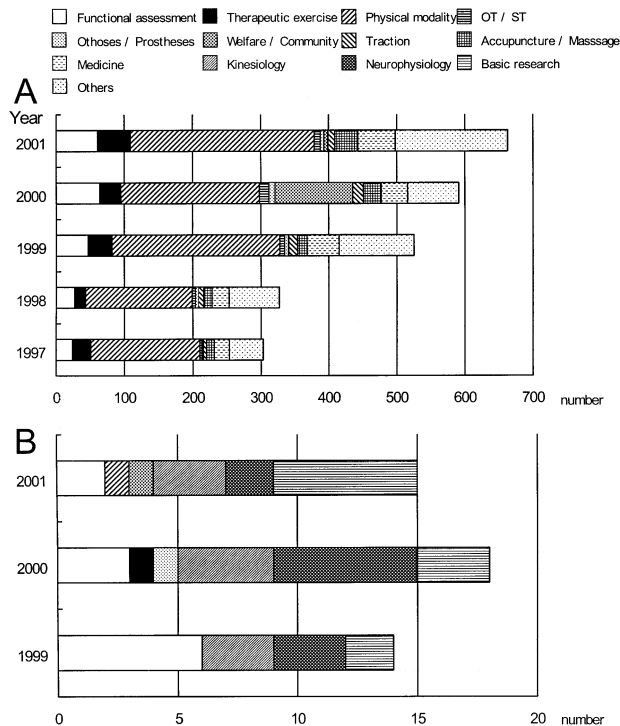


Fig. 3. Topics in 4 Chinese Journals (A) and in the Japanese official journal (B) according to the method used. OT = occupational therapy; ST = speech therapy.

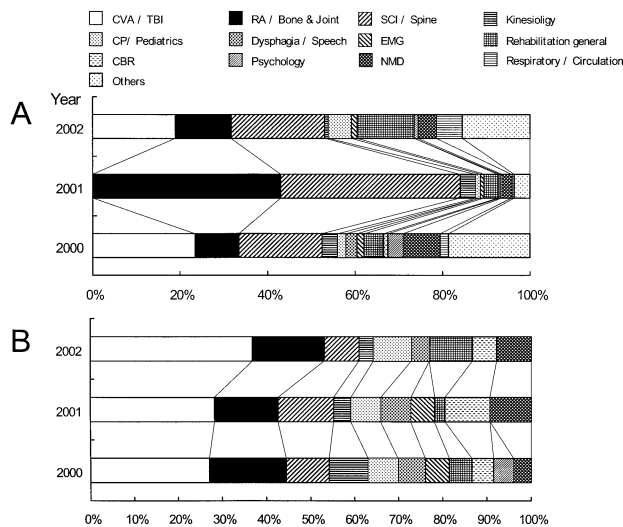


Fig. 4. Topics presented at annual congresses of the Chinese Society of Physical Medicine and Rehabilitation (A) and annual meetings of the Japanese Association of Rehabilitation Medicine (B). CVA = cerebrovascular accident; TBI = traumatic brain injury; CP = cerebral palsy; CBR = community-based rehabilitation; NMD = neuromuscular disease; RA = rheumatoid arthritis.

been paid to rehabilitation medicine than to physical medicine in recent years. Most of the original papers in journals have focused on experimental basic research related to rehabilitation medicine and most of the articles in the proceedings have

focused on clinical aspects. It should be noted that the theme of the annual meeting in 2001 was orthopaedic rehabilitation, so most of the articles were on bones and joints as well as SCI and spinal problems.

Official journal in Japan

Since 1995 the number of articles published in our official journal has been steadily increasing. Article types consist of 4 main categories; original articles, brief reports, case reports and review articles (Fig. 1B).

Figs. 2B and 3B show data on topics that have appeared in the official journal according to diagnostic group and other aspects of data according to the method used. There have been a few clinical studies and many experimental studies that have used electrophysiological techniques. On the other hand, Fig. 4B shows the topics presented at the annual meeting of the Japanese Association of Rehabilitation Medicine over the last 3 years. This can be regarded as background data to show our activity of manuscript submission to the official journal.

In order to analyse the differences found in scientific journals, a report published by the Japanese society investigated the content of some of the core rehabilitation medicine journals in the USA, *Archives of Physical Medicine and Rehabilitation* and in Europe, *Journal of Rehabilitation Medicine*. A comparison of the content of 3 representative journals among Japan, the USA and Europe according to diagnostic group and the method used has earlier been reported (1). In this analysis the data in the Japanese journal showed that there were many topics on cerebral palsy or paediatrics and a few on physical modality or orthosis/prosthesis. There is an apparent difference between the 3 journals (Table I).

Grants in China

The largest fund for scientific research was that of the Natural Science Foundation offered by the central government and run by a special committee. It has been about 200 million Euros (2 billion Chinese Yuan) in total in recent years. About 60 million Euros of this sum is devoted to basic biomedical research. The departments of the central government have also offered grants for clinical medical research. There is a category for rehabilitation medicine under the biomedical or medical category, but the amount is not fixed for either. It is possible to apply the grants to any sub-category and not limit them to rehabilitation medicine. Provinces have offered similar funds of small amounts. However, few enterprises have offered funds for research related to their products. There has been almost no private funding of medical research in China.

The number of research programs supported by different grants as categorized by supplier is shown in Fig. 5A. We have noticed that the number of grants has increased gradually over the years (43 in 1997, 36 in 1998, 51 in 1999, 74 in 2000 and 75 in 2001). The Natural Science Foundation has awarded nearly 40% of these various topics funding. As the Natural Science Foundation awarded 3–4 times more money for every topic than

Table I. Comparison of journal topics according to diagnostic group and the method used among 3 representative journals from Japan, the USA and Europe (the upper part shows the classification according to disease or disability, and the lower part shows the one according to method or therapeutics)

	Jpn J Rehabil Med 1996–2000		Arch Phys Med Rehabil 1996–2000		J Rehabil Med (Scand J Rehabil Med) 1996–2000	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
CVA	18	<u>12.6</u>	194	<u>22.4</u>	35	<u>38.0</u>
TBI	6	<u>4.2</u>	105	<u>12.1</u>	1	<u>1.1</u>
CP/paediatric	47	<u>32.9</u>	59	<u>6.8</u>	6	6.5
NMD	13	<u>9.1</u>	46	5.3	12	<u>13.0</u>
SCI	10	7.0	214	<u>24.7</u>	6	<u>6.5</u>
Amputation	9	6.3	62	<u>7.1</u>	1	1.1
Rheumatoid arthritis	2	1.4	10	1.2	2	2.2
Bone & joint	13	<u>9.1</u>	52	6.0	14	<u>15.2</u>
Malignancy	2	<u>1.4</u>	20	2.3	0	<u>0.0</u>
Transplantation	1	0.7	5	0.6	1	1.1
Respiratory	2	1.4	18	2.1	1	1.1
Circulatory	0	0.0	10	1.2	3	3.3
Dysphagia	10	7.0	11	1.3	1	1.1
Peripheral nerve	0	0.0	3	0.3	0	0.0
HBD	7	4.9	28	3.2	3	3.3
Psychology	3	2.1	31	3.6	6	6.5
	143	100	868	100	92	100
Welfare/community	1	1.4	10	1.3	0	0.0
Kinesiology	13	<u>18.8</u>	124	<u>16.4</u>	2	3.9
ADL/function	1	<u>1.4</u>	105	<u>13.9</u>	7	13.7
Exercise physiology	10	<u>14.5</u>	36	4.8	3	5.9
Neurophysiology	25	<u>36.2</u>	91	12.0	9	<u>17.6</u>
Orthosis/prosthesis	3	<u>4.3</u>	116	<u>15.3</u>	4	<u>7.8</u>
Drug therapy	2	2.9	38	<u>5.0</u>	0	0.0
Therapeutic exercise	1	1.4	76	10.1	14	<u>27.5</u>
Occupational therapy	0	0.0	17	2.2	1	<u>2.0</u>
Speech therapy	1	1.4	5	0.7	0	0.0
Physical modality	2	2.9	104	<u>13.8</u>	11	<u>21.6</u>
Basic research	7	10.1	34	<u>4.5</u>	0	<u>0.0</u>
Others	3	4.3				
	69	100	756	100	51	100

CVA = cerebral vascular accident, TBI = traumatic brain injury, CP = cerebral palsy, NMD = neuromuscular disease, SCI = spinal cord injury, HBD = higher brain dysfunction, ADL = activity of daily living.

The underlined figures indicate the top three in each section. (Partly translated from Liu M⁽¹⁾, with permission.)

other sources offered, we have concluded that most funds for rehabilitation research have come from the central government.

We categorized the research programs granted by funds according to the disease or the area that the research focused on Fig. 6A. The diseases groups supported by funds were CVA/TBI (15.9%), SCI/spine (3.9%), neuromuscular diseases (NMD) (3.4%), bone/joint (5.2%), respiratory/circulation (5.2%), dysphasia/speech disturbance (1.7%), psychology/brain function (7.3%), community-based rehabilitation (CBR) (0.4%), rehabilitation in general (15.1%) and the effects of physical modality or therapeutic exercise on normal humans or animals (41.9%). There was no fund available for research on cerebral palsy (CP)/paediatrics or dumb/deaf/blind cases during the period concerned.

The first research area was clinical study or social survey (32.3%). The second was electromyography (EMG) and biomechanics (18.6%). The EMG included needle and surface electromyography, motor and sensory nerve conduction studies, different reflexes and evoked potentials (EP) examinations. The

biomechanics included orthosis and prosthesis, and motor and balance control. The third was radiology/pathology (9.9%), including computerized tomography (CT), magnetic resonance imaging (MRI), optical microscope and electron microscope. The fourth was cell biology, transmitters, enzymes and genes (39.2%).

It was obvious that most research articles focused on the basic effect of physical modality and therapeutic exercise (41.8%) on normal subjects and the main indices were cells, molecules and genes (39.2%). CVA and TBI were the most commonly researched diseases in China. For the clinical and social statistics or survey, only 32.3% of the articles were supported financially.

Grants in Japan

From the application forms gathered from 60 medical faculties (medicine and health science) we identified a total of 2393 studies from 1998 to 2000 that could be defined as subjects related to rehabilitation science. The number of applications to the temporary category of rehabilitation science increased to 52% in that period.

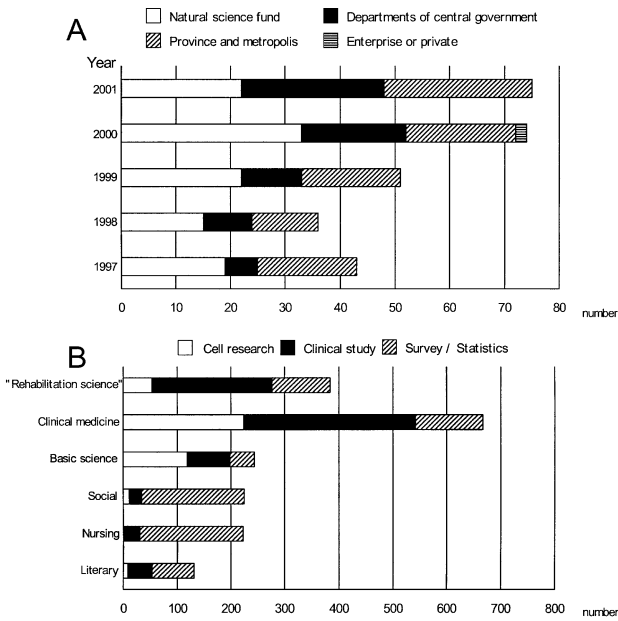


Fig. 5. Number of suppliers from different grants in China (A) and topics for Grants-in-Aid in Japan according to the method used (B).

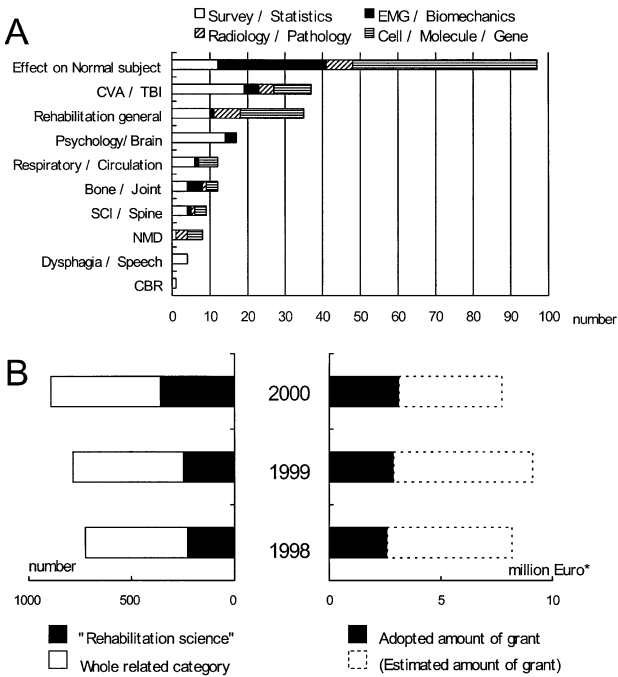


Fig. 6. Classification of the diseases and areas of the researches given grants (A) and application to rehabilitation medicine and adopted result in Japan (B). CBR = community-based rehabilitation; NMD = neuromuscular disease; EMG = electromyography.

Many applications in rehabilitation science were in the past submitted to other categories, such as clinical medicine (medicine, neurosurgery, orthopaedics, otorhinolaryngology), nursing science, social medicine (hygiene, environmental science), basic science (biology, physiology, engineering), and literary science (education, psychology). This wide range of

categories reflected the activities of rehabilitation team composed of physiatrist and other co-medical staff in Japan. This was a remarkable contrast to the range of topics reported in China, which mainly covered medical aspects.

Of the total of 2393 studies on the subject of rehabilitation science, applications in the category of clinical medicine accounted for 36%, and applications for social, literary and nursing science accounted for 12%, 7% and 12%, respectively. Applications in the category of basic science were also included if the theme of research was concerned with rehabilitation medicine and accounted for 13%. We classified the applications into 3 general groups according to what method was actually used in the research (Fig. 5B). On the whole, clinical research accounted for 38%, cellular research accounted for 22%, and statistics or survey in social medicine and nursing accounted for 39% of the applications. Cellular biological studies in rehabilitation medicine were often concerned with the brain, peripheral nervous system, musculoskeletal system and endocrine system. This tendency was also seen in other branches of medical science. Research in brain science and arterial sclerosis was promoted in many grants. In clinical research, most studies were about geriatric medicine, audio-visual disability, orthosis and prosthesis, measurement of body structure, medical devices, and complementary and alternative medicine (acupuncture, etc.). Research on stroke was widely conducted.

Fig. 6B shows other aspects of the basic data for the Grants-in-Aid, these are 1) an adoption rate of approximately 24–30% and 2) a cover rate for the applied amount of money of approximately 70–80%. The number of applications to both all of the related categories (723 in 1998, 782 in 1999 and 888 in 2000) and to temporary assigned rehabilitation science (228 in 1998, 247 in 1999 and 357 in 2000) increased during those years.

The total money adopted for temporary assigned rehabilitation science was about 2.6–3.1 million Euros (337–404 million yen). Based on this figure, we estimated it would cost 7.7–9.1 million Euros overall if one considers the total amount of money that would be taken up by whole related categories.

DISCUSSION

China and Japan are the 2 major countries in Asia in terms of political and economical power, with populations of 1.4 billion in China and 120 million in Japan.

Looking at the present condition of rehabilitation medicine in both countries provides a great contrast. Japan has already introduced westernized medical systems for clinical practice over the last 150 years. The academic society of Japan on rehabilitation medicine was founded in 1963. On the other hand, China has maintained its particular medical system, which includes some aspects borrowed from western countries including Russia, and others taken from Chinese traditional medicine. There is as yet no unified academic society on rehabilitation medicine in China (2).

In both countries the founders of these societies went abroad

(mainly to the USA), learned rehabilitation medicine, and brought back the concepts and methods to establish this specialty in their own countries. And both are now involved in the recent dramatic changes brought about by information technology. Even before 2002, there were some opportunities to exchange information and to promote mutual co-operation among the 2 countries and others (3–5), which is still ongoing (6).

This article is the first successful result of a new partnership between the 2 academic societies, and such co-operation should continue to be promoted. However, there are still problems to be solved with respect to our scientific productivity and language of communication. The language used in the China–Japan Medical Conference was English. This is symbolic of the present situation, clearly illustrating that English has great influence and exerts a heavy burden for researchers whose first language is not English. For researchers outside China and Japan, it is difficult to access freely the studies performed in these countries as most of them were published in their own native language. Non-English speaking researchers require a stronger incentive to publish their works in international journals than in domestic journals, while English-speaking researchers easily develop the necessary discipline during domestic activity.

Journal publication

The Chinese (including various dialects) and Japanese languages are well adjusted to describe modernized scientific matters and to maintain high-level domestic scientific disciplines. However, researchers from both China and Japan still suffer from a so-called “language barrier”, and this is the main problem we confront at present. In a dramatically changing world of information technology, scientific achievements can be shared instantly across the world via computer networks. Under these circumstances, more researchers in the field of rehabilitation medicine submit their articles to rehabilitation journals in English that are indexed in databases such as MEDLINE. Unfortunately our journals have not yet been indexed in MEDLINE as a *de facto* standard regimen. One of the Japanese authors (ML) gave full particulars of this issue in another article (7).

There are reports of using search techniques with computer databases to elicit the number and topic of journal articles originating from each country (8–10). We require more relevant data about our activities on rehabilitation medicine in journal publishing. We recognize the limitation of the method used in the present study, but this is also related to the issue of which language is chosen for communication in the medical field. We aim to catch up with the current information technology available, to incorporate data from our journals in worldwide computer databases and to operate an on-line electronic journal. However, whether we maintain our official journal in our mother tongues or not will remain unsolved. This dilemma might be common to researchers in all non-English-speaking countries.

Funding supply

The value of grants awarded in the field of rehabilitation science in Japan is estimated at 2.6–3.1 million Euros per year and will increase. Information concerning China is, unfortunately, unavailable. The grant amounts obviously depend on the economic situation in both countries. A problem to be solved in the future with the application for grants data is accountability for competitive fund in order to maintain fairness and discretion.

Research activity

In both China and Japan, research focusing on gene and cell biology is common in rehabilitation science. However from a clinical standpoint, China has a large population living under poor socio-economic conditions mainly in rural inland regions (11). Rehabilitation medicine will play an important role in improving the medical and health status of people in such areas (12).

On the other hand, in Japan there is a rapidly ageing population and changing disease structure. It is anticipated that the increasing costs of medical care will put a strain on the Japanese economy in the near future. This situation is true for China too. Therefore, home healthcare for elderly people rather than hospitalization is being emphasized and research in long-term care and home healthcare for these people is a matter of urgent necessity. Research in geriatric medicine and home healthcare is promoted precisely because of the ageing society.

We should give priority to clinical research covering the above-mentioned problems in each country over basic cell biology. We should also organize clinical research satisfying the study designs required from a viewpoint of evidence-based medicine in the future.

We hope that this will be but the first step toward providing the latest information from Asian countries to the rest of the world on their activities in rehabilitation medicine.

CONCLUSION

In spite of the fact that rehabilitation medicine is a relatively young specialty of medical science, research in this field in Japan has been increasing. The same is true in China. We should promote mutual co-operation between our 2 societies and maintain our efforts to provide information about rehabilitation research to other countries in order to share our experiences, and *vice versa*, and to overcome the so-called language barrier.

ACKNOWLEDGEMENTS

We thank Dr T. Maeno for his help in analysing the data on official grants in Japan and Ms R. Kuramochi and Mr T. Kato for preparation of the figures.

REFERENCES

1. Liu M. Research trend in rehabilitation medicine. In: White Paper of Medical Rehabilitation. Japanese Association of Rehabilitation Medicine; 2003, p. 49–57 (in Japanese).
2. Chino N, Grimby G, Smith DS, Ring H, Imamura ST. International issues in rehabilitation medicine. In: DeLisa JA, Gans BM, eds. Rehabilitation medicine; principles and practice. 3rd edn. Lippincott-Raven; Philadelphia; 1998, p. 47–54.
3. Chino N, Ishigami S, Akai M, Liu M, Okajima Y, Koike J, Kobayashi K. Current status of rehabilitation medicine in Asia; a report from New Millennium Asian Symposium on Rehabilitation Medicine. *J Rehabil Med* 2002; 34: 1–4.
4. Zhuo D. Practice of medical rehabilitation: recent advances in China. Abstract book of New Millennium Asian Symposium on Rehabilitation Medicine; Tokyo; 2001, p. 11.
5. Wu Z, Yu H. The rehabilitation research in China. Abstract book of New Millennium Asian Symposium on Rehabilitation Medicine; Tokyo; 2001, p. 31.
6. Wu Z, Wang Q, Wu J. The research and practice of rehabilitation medicine in China. Proceedings of the 2nd World Congress of the International Society of Physical and Rehabilitation Medicine. Prague, Free Paper D519C0074, Monduzzi Editore; Bologna; 2003, p. 555–558.
7. Liu M, Hase M, Masakado Y, Tsuji T, Otaka Y, Chino N. Rehabilitation research from a non-English speaking country published in peer-reviewed English journals; The Japanese experience. *Disabil Rehabil* 2003; 25: 1304–1311.
8. Gagnon RE, Macnab AJ, Gagnon FA. A quantitative ranking of Canada's research output of original human studies for the decade 1989 to 1998. *Can Med Assoc J* 2000; 162: 37–40.
9. Fukui T, Rahman M. Contribution of research in basic and clinical sciences in Japan. *Intern Med* 2002; 41: 626–628.
10. Rahman M, Sakamoto J, Fukui T. Japan's share of articles in orthopedics. *J Orthop Sci* 2002; 7: 607–609.
11. Li J, Zhou S. Experience in community-based rehabilitation in Chinese country-side. Abstract book of the 1st World Congress of the International Society of Physical and Rehabilitation Medicine. Amsterdam; 2001, p. 124.
12. Zhuo D, Kun ND. Community-based rehabilitation in the People's Republic of China. *Disabil Rehabil* 1999; 21: 490–494.