



Review Article

# Evaluation of research trends in physical therapy through analysis of articles published at the world confederation for physical therapy congress

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**Abstract.** [Purpose] The purpose of this study was to examine research trends in physical therapy through analysis of articles published at the 2015 World Confederation for Physical Therapy Congress. [Subjects and Methods] A total of 1,339 were analyzed (presentations: 346, posters: 993). The number of papers per subject area, number of oral presentations and posters, and the number of moderator nations and regional publications were analyzed by subject area. The mean and standard deviation was used for statistical analysis. [Results] Of 1,339 items published, the musculoskeletal spine was the most common theme, with 89. Among oral presentations, 24 had cardiorespiratory themes; among poster presentations, themes related to the elderly were the most common, at 76. Eleven moderators were from Australia, and the most frequent regional source of papers was Japan, with 238. [Conclusion] The 2015 WCPT Congress published papers in a variety of subject areas; Australia and the UK presented many papers, but Japan had the most of any region, at 238.

**Keywords:** Research trend, Physical therapy, 2015 WCPT Congress

(This article was submitted Jul. 8, 2016, and was accepted Aug. 11, 2016)

## INTRODUCTION

The WCPT (World Confederation for Physical Therapy) was organized in 1951 by 11 countries including Australia, Canada, Denmark, Finland, the UK, New Zealand, Norway, South Africa, West Germany, Sweden, and the United States in Denmark's capital, Copenhagen. In 1953, the first congress and the second international conference were held in London<sup>1,2</sup>.

In 1991, the WCPT was divided into 5 regions, representing Africa, Asia and the Western Pacific, Europe, North America, and South America; in 2011, 12 subgroups were formed, for special interest in the nervous system, seniors, children, sports, and others.

As of 2015, the WCPT has participants in more than 106 Member States and more than 350,000 members. The Republic of Korea formed the KPTA (Korean Physical Therapy Association) in 1965<sup>3</sup>), and joined the WCPT as a Member State in 1974<sup>4</sup>).

The first WCPT Congress was held in London in 1953, followed by the United States (New York, 1956), France (Paris, 1959), Denmark (Copenhagen, 1963), Australia (Melbourne, 1967), the Netherlands (Amsterdam, 1970), Canada (Montreal, 1974), Israel (Tel Aviv, 1978), Sweden (Stockholm, 1982), Australia (Sydney, 1987), the UK (London, 1991), United States (Washington, 1995), Japan (Yokohama, 1999), Spain (Barcelona, 2003), Canada (Vancouver, 2007), and the Netherlands (Amsterdam, 2011)<sup>1</sup>). The 17th Congress was held in Singapore in May 2015.

In 2011, the 16th WCPT Congress, held in Amsterdam, was attended by more than 5,000 physical therapists, from more

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than 100 countries. A total of 2,303 articles were presented, including 1,668 posters.

Papers published in journals can be used to identify trends, and are an efficient means of following academic progress and learning about advanced courses in a field<sup>5-7</sup>). Previous studies, reported the value of examining specific trends of academic research, and also suggested that reviewing publications could be a good method to explore the direction of advances and research activities<sup>8-10</sup>).

The WCPT Congress provides information on recent research, study characteristics study, and societal trends, as well as the current direction of research in physical therapy, because high-quality papers from each country are presented.

No study analyzing international trends in physical therapy through papers published by the WCPT Congress has been reported.

The present study analyzed these papers to determine the current state and trends of physical therapy in South Korea.

## SUBJECTS AND METHODS

This study analyzed a total of 1,339 research papers published at the 17th WCPT Congress, held in Singapore in May 2015, and included 346 oral presentations and 993 poster papers published in the Program Manual<sup>11</sup>).

We analyzed presentations by country, the number of published articles according to subject, oral presentation, poster presentation, and Chair; countries participating in a Chair; and the subjects of articles by nation and percentage of published articles.

We calculated averages, frequency, and percentage by using SPSS version 12.0 (SPSS for Windows; SPSS Inc., Chicago, IL, USA).

## RESULTS

Japan had the most presentations, with 238 items, followed by Australia with 139, the UK with 130, the USA with 84, Sweden with 65, and South Korea with 16 (Table 1).

Among 43 research topics, the musculoskeletal spine was the most common theme, with 89 items, followed by human movement analysis, with 88, Older people, with 84, pediatrics, with 68, and stroke, with 63; primary health care and information management and technology were least represented, with 6 each (Table 2).

There were 346 oral presentations in the 43 subject areas, accounted for by only 30 regions. Cardiorespiratory themes were the most common, with 24, followed by musculoskeletal spine, with 23; continuing professional development, critical care, and health promotion and wellbeing each accounted for 18; human movement analysis and musculoskeletal themes each accounted for 17. There were 993 poster presentations, representing all 43 subject areas; presentations on older people accounted for 76, human movement analysis for 71, and pediatrics and stroke for 57 each (Table 2).

A total of 24 countries participated in a Chair, with Australia the most frequent, at 11, the USA at 10, the UK at 7, New Zealand at 6, and Singapore, South Africa, and Canada at 5 each (Table 3).

The largest number of cardiorespiratory papers was presented by Japan and Brazil, followed by Australia, with complementary therapies, Japan, with exercise physiology, Taiwan, with pediatrics, and Switzerland, with women's health (Table 2, 4). The UK published papers in 42 of the 43 subject areas, at 97.6%, followed by Australia at 79.0%, Japan at 74.4%, the USA at 72.0%, Sweden at 58.1%, Brazil at 55.8%, Singapore at 48.8%, India at 46.5%, and Canada at 44.1%; South Korea published in 8 of 43 subject areas, at 18.6% (Table 5).

## DISCUSSION

Research specialization has recently become important in physical therapy and rehabilitation<sup>12</sup>). Thus, we analyzed the international status and trends of physical therapy research based on articles published at the WCPT Congress. We used this analysis to identify the future direction of physical therapy research in Korea.

The analysis was based on the general status of published papers, oral presentations, and poster presentations, the distribution of Chair nations, and the number of articles by subject area.

The 2015 WCPT Congress published 1,339 items (346 presentation and 993 posters). This was less than the 2,303 published in 2011 in Amsterdam.

Japan published the most papers (238, with 232 poster presentations, and 6 oral presentations). Japan has made significant advance in physical therapy since the 13th WCPT Congress in Yokohama, but primarily poster presentations in 2015, possibly due to the language problems of oral presentations.

Australia published 139 items, balanced between oral and poster presentations, followed by the UK at 130, the USA at 84, and Sweden at 65; thus, English-speaking countries and the Organization for Economic Co-operation and Development (OECD) countries accounted for many items.

Notably, Brazil was the only presenting Latin American country, with 54 items. In Asia, Taiwan presented 55 items, Singapore 39, India 37, Hong Kong 23, China 22, and South Korea 16. Japan holds a dominant position in Asia, but China presented 22 articles, suggesting that the area of physical therapy is gradually developing.

**Table 1.** Presentations by country (N=1,339)

Nation	Presentation	Poster	Total
Japan	6	232	238
Australia	74	65	139
United Kingdom	49	81	130
United States America	20	64	84
Sweden	23	42	65
Taiwan	3	52	55
Brazil	7	47	54
Canada	15	26	41
Singapore	12	27	39
India	2	35	37
Ireland	11	25	36
Switzerland	13	22	35
Norway	18	13	31
Netherlands	15	14	29
Hong Kong	6	17	23
South Africa	10	12	22
China	5	17	22
Finland	7	11	18
New Zealand	9	8	17
Nigeria	5	11	16
<b>South Korea</b>	<b>0</b>	<b>16</b>	<b>16</b>
Israel	1	13	14
Belgium	3	10	13
Denmark	3	9	12
Germany	5	6	11
Italy	2	8	10
Colombia	0	10	10
Thailand	2	8	10
Egypt	2	7	9
Iran	0	8	8
Malawi	1	7	8
Malaysia	1	7	8
Portugal	3	5	8
Greece	1	6	7
Spain	0	6	6
Iceland	3	2	5

**Table 1.** Continued

Nation	Presentation	Poster	Total
Philippines	1	4	5
Saudi Arabia	1	4	5
Slovenia	1	3	4
Sri Lanka	1	3	4
Bahrain	0	3	3
Czech	0	3	3
France	2	1	3
Nepal	0	3	3
Chile	0	2	2
Africa	0	2	2
Estonia	0	2	2
Haiti	0	2	2
Jordan	0	2	2
Tanzania	0	2	2
Pupuanewgihea	1	1	2
Angola	0	1	1
Apan	0	1	1
Arab Emirates	1	0	1
Argentina	0	1	1
Austria	0	1	1
Benin	0	1	1
Cape Verde	0	1	1
Croatia	0	1	1
Ethiopia	0	1	1
Malawi	1	0	1
Kenya	0	1	1
Kuwait	0	1	1
Lebanon	0	1	1
Mauritius	1	0	1
Namibia	0	1	1
Pakistan	0	1	1
Togo	0	1	1
Turkey	0	1	1
<b>70 countries</b>	<b>346</b>	<b>993</b>	<b>1339</b>

**Table 2.** The number of published articles according to subject

No.	Subject	Presentation	Poster	Total
1	Cardiorespiratory	24	48	72
2	Clinical education	9	19	28
3	Complementary therapies	13	7	20
4	Continuing professional development	18	6	9
5	Critical care	18	9	27
6	Disability and rehabilitation	13	9	22
7	Education	7	21	28
8	Electrophysical and isothermal agents	10	27	37
9	Exercise physiology	8	25	33
10	Global Health	16	16	32

**Table 2.** Continued

No.	Subject	Presentation	Poster	Total
11	Health promotion and wellbeing	18	11	29
12	<b>Human movement analysis</b>	17	71	<b>88</b>
13	Mental health	7	12	19
14	Method of teaching and learning	15	26	41
15	Multiple sclerosis	9	9	18
16	Musculoskeletal	17	19	36
17	Musculoskeletal lower limb	10	30	40
<b>18</b>	<b>Musculoskeletal spine</b>	<b>23</b>	<b>66</b>	<b>89</b>
19	Musculoskeletal upper limb	8	20	28
20	Neurology	3	16	19
21	Non-communicable disease and risk factors	0	11	11
22	Occupational health and ergonomics	0	12	12
23	<b>Older people</b>	8	76	<b>84</b>
24	Oncology and palliative care	8	15	23
25	Orthopaedics	7	34	41
26	Outcome measurement	9	45	54
27	<b>Pediatrics</b>	11	57	<b>68</b>
28	Pain and pain management	12	13	25
29	Parkinson's	0	12	12
30	Primary health care	0	6	6
31	Professional issue	0	16	16
32	Professional practice; other	8	11	19
33	Qualifying education	0	14	14
34	Quality and standards	0	12	12
35	Research methodology and implementation	7	16	23
36	Rheumatology	0	9	9
37	Robotics and technology	0	9	9
38	Service delivery & emerging roles	0	13	13
39	Spinal cord injury	0	15	15
40	Sport and sports injuries	7	39	46
41	<b>Stroke</b>	6	57	<b>63</b>
42	Women's health	0	28	28
43	Information management and Technology	0	6	6

**Table 3.** The number of Chairs and countries participating a Chair

Ranking No.	Chair Nation	Number
1	Australia	11
2	USA	10
3	UK	7
4	New Zealand	6
5	Canada/Singapore/South Africa	5
6	Sweden	4
7	Netherlands	2
8	Belgium/Brazil/China/Chile/Denmark/Finland/Iceland/Ireland/Nigeria/Philippines/Portugal/Saudi Arabia/Taiwan/Trinidad and Tobago/Venezuela	1

**Table 4.** The nation according to subject and percentage of published articles

Subject No.	Nation (Number, %)		
	1st	2nd	3rd
1	Japan/Brazil (14, 19.4)	Australia (9, 12.5)	UK (7, 9.7)
2	Australia (5, 17.8)	Canada/UK/USA (3, 10.7)	South Africa/Ireland (2, 7.1)
3	Australia (6, 30.0)	USA (3, 15.0)	UK (2, 10.0)
4	UK (5, 20.8)	Australia (4, 16.6)	Canada/Switzerland (3, 12.5)
5	UK (9, 33.3)	Australia (4, 14.8)	USA (3, 11.1)
6	USA (7, 31.8)	Singapore (3, 13.6)	Brazil/Japan/UK (2, 9.0)
7	USA (7, 25.0)	Canada (6, 21.4)	Sweden (3, 10.7)
8	Japan (13, 35.1)	Australia, Brazil (4, 10.8)	Taiwan (3, 8.1)
9	Japan (16, 48.4)	Australia (3, 9.0)	
10	Australia (6, 18.7)	UK (4, 12.5)	Japan/Ireland/USA (3, 9.3)
11	Australia (7, 24.1)	UK (4, 13.7)	Hong Kong (3, 10.3)
12	Japan (40, 45.4)	Australia (8, 9.0)	Sweden (7, 7.9)
13	Norway (3, 15.7)	Australia/Ireland (2, 10.5)	
14	USA (7, 17.0)	Australia/Canada (6, 14.6)	UK (3, 7.3)
15	Australia (5, 27.7)	Brazil (2, 11.1)	
16	Japan (9, 25.0)	UK (6, 16.6)	Australia (5, 13.8)
17	Japan (9, 22.5)	Australia (4, 10.0)	USA (3, 7.5)
18	Australia (17, 19.1)	Sweden (8, 8.9)	Japan (7, 7.8)
19	Japan (7, 25.0)	Egypt/Hong Kong/ Switzerland/UK/USA (2, 7.1)	
20	Japan/USA (3, 15.7)	Australia/Belgium/Sweden/UK (2, 10.5)	
21	Nigeria (3, 27.2)	Japan/UK (2, 18.1)	Australia/India/Norway/Sweden (1, 9.0)
22	India/ Sweden (2, 16.6)		
23	Japan (39, 46.4)	Taiwan (8, 9.5)	Australia/India/Singapore (4, 4.7)
24	Ireland/Hong Kong/Japan/USA (3, 13.0)	Netherlands (2, 8.6)	
25	Japan (10, 24.3)	Israel/Ireland/UK (3, 7.3)	Denmark/Egypt/Netherland/ India/Sweden (2, 4.8)
26	Greece/Taiwan (5, 9.2)	USA (4, 7.4)	Canada/Egypt/Japan/Sweden/UK (3, 5.5)
27	Taiwan (11, 16.1)	Australia (10, 14.7)	Brazil (6, 8.8)
28	UK (9, 36.0)	USA (2, 8.0)	
29	Japan/Jordan/Taiwan/UK (2, 16.6)	Australia/Israel/Singapore/Sri Lanka (1, 8.3)	
30	Ireland/Lebanon/Namibia/Netherlands/ Sweden/UK (1, 16.6)		
31	UK (4, 25.0)	India/Ireland/Netherlands (2, 12.5)	
32	Japan (5, 26.3)	Australia (3, 15.7)	Finland/Sweden/Singapore (2, 10.5)
33	Australia (3, 21.4)		
34	UK (3, 25.0)	Iran/Switzerland (2, 16.6)	Australia/Hong Kong/Israel/Japan/ Netherlands (1, 8.3)
35	UK (5, 21.7)	Australia (4, 17.3)	Netherlands (2, 8.6)
36	UK (2, 22.2)		
37	Japan (4, 44.4)	Singapore/UK (2, 22.2)	Belgium/New Zealand (1, 11.1)
38	Israel/UK (2, 15.3)		
39	Japan/Sweden (3, 20.0)	UK/USA (2, 13.3)	Brazil/India/Norway/Slovenia/ Switzerland (1, 6.6)
40	Japan (11, 23.9)	Sweden (5, 10.8)	UK (4, 8.6)
41	Japan (19, 30.1)	Taiwan (6, 9.5)	Sweden (5, 7.9)
42	Switzerland (4, 14.2)	Japan/Nigeria/UK/USA (3, 10.7)	Brazil/India/Slovenia (2, 7.1)
43	UK (2, 33.3)	Australia/Finland/Iceland/Ireland (1, 16.6)	

Note the name of the subject on Table 2. One thing subject to 100%, calculated as the number and a percentage of each nation published articles.

**Table 5.** The nation rankings published articles in the subjects

Ranking No.	Nation	Number	Percentage (%)
1	UK	42	97.6
2	Australia	34	79.0
3	Japan	32	74.4
4	USA	30	72.0
5	Ireland/Sweden	25	58.1
6	Brazil	24	55.8
7	Singapore	21	48.8
8	India/Switzerland	20	46.5
9	Canada	19	44.1
10	Netherlands	18	41.8
11	Norway	17	39.5
12	China	16	37.2
13	Taiwan	15	34.8
14	New Zealand/Belgium/South Africa	13	30.2
15	Hong Kong/ Finland	12	27.9
16	Israel	11	25.5
17	South Korea/Germany/Denmark/Nigeria/Italy	8	18.6
18	Egypt/Thailand	7	16.2
19	Columbia/Malaysia	6	13.9
20	Iceland/Saudi Arabia/Philippines	5	11.6

Note the calculated that 43 subjects published on a 100%

When compared with Taiwan, India, Singapore, Hong Kong, and China, Korea requires development in the area of physical therapy. The fact that Korea presented 16 items solely as poster presentations suggests the need to overcome language barriers.

To determine whether all disciplines in physical therapy showed balanced development, we analyzed the number of papers published in each subject area. Of 1,339 papers, musculoskeletal spine (89 items) and human movement analysis (88 items) subject areas were the most commonly represented. This suggests greater interest in the analysis and treatment of neck and back symptoms, and in human movement analysis.

The second largest number of published papers was related to the older people, reflecting a global increase in the elderly population. This is expected, as physical therapy is needed by many chronic patients.

Cardiorespiratory themes accounted for 72 items and stroke for 63. This figure suggests that physical therapy research should target the elderly, who commonly experience stroke and breathing disorders.

Primary health care, rheumatology, robotics and technology, and information management and technology were each represented by less than 10 papers.

Even though extensive research has been performed on robotics and technology in medical rehabilitation<sup>13, 14</sup>), the small number of papers presented suggests that physical therapists are still challenged by the accessibility and usability of these areas.

The invitation to serve as a Chair is recognition of authoritative expertise in a field of study. Therefore, we analyzed the number of countries invited to provide a Chair in the 2015 Congress. Of the 24 countries represented by a Chair for the 3 days and 70 sessions, Australia had the greatest number participating, in 11 sessions, followed by the USA in 10, the UK in 7, New Zealand in 6, Singapore, Canada, and South Africa in 5 each, and Sweden in 4. Most were English-speaking countries. Taiwan and China were the non English-speaking countries invited to provide a Chair. This should inspire ongoing effort to require internationalization of physical therapy in South Korea by the KPTA.

Presentations were made in all 43 subject areas. The UK published a paper in 42 of the 43 areas (97.6%), with the exception of occupational health and ergonomics. This showed balanced development in all fields of physical therapy. Australia published in 79.0%, reflecting similarities to the UK in research and educational institutions. Australia appears to have great influence on physical therapy in the world. Japan published in 74.4%, reflecting a relatively wide range of development. In particular, Japan published 39 items on older people reflective of a super-aged society<sup>15</sup>). These publications again remind us of the challenges facing Japan.

In Asia, Singapore published in 48.8% (21 of 43 areas), India in 46.5% (20), China in 37.2% (16), Taiwan in 34.8% (15), and Hong Kong in 27.9% (12). On the other hand, South Korea published in 18.6% (8); this shows that physical therapy in South Korea has only developed in certain areas. The elderly population has increased exponentially in South Korea<sup>16</sup>).

Nonetheless, there were no reports on the elderly. Despite the importance of sports in South Korea, there were also no sports-related articles. Moreover, there were no papers published in the cardiorespiratory field, women's health, professional education system, occupational health and ergonomics, oncology and palliative care, or robotics and technology. This is a challenge for the future, showing that physical therapy should be developed in many directions.

This study has several limitations. First, this study lacked specific information about the state of physical therapy in each country because only articles published at the 2015 WCPT Congress were analyzed. Thus, the ability to accurately analyze and compare the state of physical therapy in different countries was limited. Second, the 2015 WCPT Congress was held in Singapore. Thus, it was relatively easy for Asian countries to participate. Despite these limitations, the analysis of papers provides sufficient information to determine the status of physical therapy in South Korea.

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