

Competition or complement: relationship between judo therapists and physicians for elderly patients with musculoskeletal disease

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Received: 12 April 2007 / Accepted: 31 October 2007 / Published online: 29 March 2008
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Abstract

Objectives Among the complementary and alternative medical services available in Japan, only judo therapists are covered under the national health-insurance program without a referral from a physician. Many orthopedists claim that judo therapists deprive them of potential patients. If such competition exists, fewer patients would be expected to visit orthopedists in areas where many patients visit judo therapists. Therefore, we examined the correlation between the number of patients visiting judo therapists and those visiting physicians for musculoskeletal diseases.

Methods In a cross-sectional study covering each prefecture in Japan ($n = 47$), we obtained figures for the numbers of judo therapist facilities and elderly patients (over 70 years old) who visited them and the numbers of orthopedists and patients who visited physicians for musculoskeletal diseases. Correlations between the numbers of practitioners per 100,000 population and the numbers of their patients per 100,000 population were examined by prefecture.

Results There were positive correlations between the numbers of judo therapist facilities and elderly patients who visited them ($r = 0.72$, $P < 0.01$, $n = 47$), and between the numbers of orthopedists and elderly patients who visited physicians for musculoskeletal diseases ($r = 0.32$, $P = 0.03$). However, there was no significant correlation between the numbers of elderly patients who

visited judo therapist facilities and those who visited physicians ($r = 0.06$, $P = 0.68$) for musculoskeletal diseases. **Conclusions** This study did not find a negative correlation between the numbers of patients visiting judo therapists and patients visiting physicians for musculoskeletal diseases. Thus, these results do not support the orthopedists' claim that the two services compete for patients.

Keywords Distribution · Health-care service · Judo therapist · Elderly patient · Orthopedist

Introduction

Judo therapy, which specializes in the manual treatment of musculoskeletal diseases, is one of Japan's complementary and alternative medical treatment (CAM) options. In addition to judo therapists, practitioners of massage therapy, acupuncture, and moxibustion are licensed by the Japanese government as CAM providers, but of these, only judo therapists are licensed to provide services covered under the Japanese health-insurance system without a medical doctor's consent for certain injuries (sprains, bruises, and soft tissue damage); the other providers must acquire a physician's consent in order to be covered by the health-insurance system.

As for other countries, it has been reported that 42% of Americans use some form of alternative therapy [1] and that about 15% of Canadians aged 15 years or older use some form of alternative health care annually [2]. Among CAM practitioners, chiropractors are visited on a regular basis in many countries and are comparable with judo therapists, as chiropractors also primarily use manual treatments. Researchers have conducted many studies on the relationship between chiropractors and other

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health-care providers. For example, it has been determined that 39% of Americans with acute lower back pain have chosen to visit a chiropractor over other health-care practitioners [3, 4]. Several studies have reported that patients with lower back pain considered chiropractic treatment more helpful and satisfactory than that provided by physicians or orthopedists [5, 6].

Frequent use of CAM does affect national medical expenditure. In Canada, a study reported that use of CAM increased medical costs [2]. Health-insurance programs in other countries provide partial reimbursement for CAM fees [7–9], and insurers have indicated concern about related costs [10, 11].

However, relatively few studies on CAM use and its cost have been conducted in Japan [12]. Because most practitioners are unable to bill health insurers independently, Japanese health service researchers have not paid much attention to CAM; in fact, related data such as the numbers of CAM practitioners has rarely been aggregated, making it difficult to obtain and analyze such data for studies.

According to a survey by the Japanese government [13], the number of people who visited CAM practitioners for musculoskeletal diseases was 1,312 per 100,000 population, which is approximately 50% of the number who visited physicians for such problems (2,825 per 100,000 population). In Japan, the proportion of elderly (over 65 years old) in the overall population has been rapidly increasing (18.5% in 2002), and the number of people who visited CAM providers was higher among the elderly population (4,641 per 100,000 population). Thus, CAM use by the elderly is a sizable share of health services in Japan. Moreover, the demand for CAM could increase because the prevalence of musculoskeletal chronic disease increases with age. Consequently, it is reasonable to evaluate the relationship between physicians and CAM practitioners and assess the appropriate contribution each makes to elderly people's health.

Many orthopedists have claimed that some of their potential patients are being taken away by judo therapists because of the overlapping services, especially after a substantial increase in the number of judo therapists in recent years [14, 15]. At the Annual Congress of the Japanese Orthopaedic Association, for instance, the amount spent on judo therapists was discussed by orthopedists, as they were worried their own future business and insisted on the need to send a message to the public about the difference between orthopedists and CAM practitioners [16–19]. If judo therapists and orthopedists are competing for patients, then fewer patients on a per capita basis would be expected to visit orthopedists in areas where more patients visit judo therapists or where more judo therapists are practicing.

To examine if such competition between orthopedists and judo therapists exists, we attempted to demonstrate

negative correlations between the number of judo therapist facilities or the number of patients who visit a judo therapist and the number of patients who visit physicians for musculoskeletal disease among the elderly population.

Materials and methods

Numbers of judo therapists and orthopedists

Before opening a facility, a judo therapist is required to register at a designated public health center. Thus, some statistics on judo therapists are readily available, but these may not be accurate, as they only provide the number of facilities, not the number of therapists. Also, statistics are usually not updated when facilities close. Therefore, instead of the governmental statistics we used the Internet Townpage (NTT Directory Services Co., Tokyo, Japan) [20], a directory of Worldwide Web sites. We accessed the Townpage from September to November 2002 to determine the number of active judo therapist facilities in 3,218 municipalities throughout Japan. In each search, we used the keywords “judo therapist” and the name of the municipality and selected only those offering “*Sekkotsu-in*” (facility for bone setting) and “*Seikotsu-in*” (osteopathy facility). To be covered by the Japanese health-insurance system, the Judo Therapist Act requires that the services provided by the licensed judo therapists include these two types of facility. Some licensed judo therapists practice in medical centers or hospitals with physicians, but they are unable to bill for their services through the Japanese health-insurance system.

In contrast with the lack of requirements for judo therapists, physicians must register their place of business every two years. Since 1977, the Ministry of Health, Labour and Welfare of Japan has published the total number of physicians by municipality. For this study, we took the number of orthopedists from a national survey, “*Ishi Shikaishi Yakuzaiishi Chosa*” (Survey of Physicians, Dentists, and Pharmacists 2002) [21]. We selected orthopedists who worked for medical facilities and those who operated private practices.

Patients visiting judo therapists

We obtained the number of patients who visited judo therapists from the “*Rojin Iryo Geppo*” (Monthly Report of Health Care for the Elderly) [22], aggregated by the Health Insurance Bureau, Ministry of Health, Labour, and Welfare. This health insurance covers the elderly aged 70 years and over, the age group that we used for the study subjects. From this report, we derived the number of patients who

visited judo therapists in the following category: “*Judo-Seihukushi no Sejutsu*” (Treatment of Judo Therapists) in October 2002.

Patients visiting physicians for musculoskeletal diseases

We obtained data on the numbers of patients who visited physicians for musculoskeletal diseases from the “Patient Survey 2002” [23], a report by the Ministry of Health, Labour and Welfare, Japan. In this study, we examined outpatients with musculoskeletal diseases falling under the following categories: rheumatoid arthritis (M05, M06), arthrosis (M15–19), spondylopathies (M45–M49), lumbago with sciatica (M54.4), osteoporosis (M80–M82), fracture (S02, S12, S22, S32, S42, S52, S62, S72, S82, S92, T02, and T12) and dislocation, sprain, and strain (S03, S13, S23, S33, S43, S53, S63, S73, S83, S93, T03, and T14.3) in accordance with the “Diseases of the musculoskeletal system and connective tissue” of Chap. XIII and “Injury, poisoning and certain other consequences of external causes” of Chap. XIX in ICD-10.

These musculoskeletal diseases may not necessarily be treated by orthopedists, but can be treated by a general practitioner or physicians in other specialties.

Population by prefecture

We obtained population figures (aggregate and age-specific) for each prefecture broken down by age (five-year groups) and sex. This came from the figures (Table 10) of the “Current Population Estimates (as of 1 October 2002)” provided by the Statistics Bureau, Ministry of Internal Affairs and Communications, Japan [24]. To calculate the rate of facilities and patients in each prefecture, we gathered data on both the total population and the population of those who were 70 years old and older.

Analysis

We examined the relationships among the four variables (i.e., judo therapist facilities, orthopedists, patients who visited judo therapists, and patients who visited physicians for musculoskeletal diseases) after converting these into rates (per 100,000 population) for each prefecture. We compared the correlations among the four variables of each prefecture ($n = 47$) using Spearman’s correlation coefficients. We also compared elderly patients and all-age patients who visited a physician for musculoskeletal

disease to characterize musculoskeletal diseases among the elderly.

We hypothesized that if judo therapists and orthopedists compete for similar patients, i.e., those seeking treatment for musculoskeletal problems, there would be a negative correlation between the rates of patients who visited physicians for musculoskeletal diseases and patients of judo therapists (or judo therapist facilities). In economics, the cross elasticity of demand is defined as the change in the quantity demanded of commodity X divided by the change in the price of commodity Y , and can be positive or negative, depending on the relationship between the commodities. Whether commodities X and Y are classified as substitutes or complements depends on whether the cross elasticity of demand is positive or negative. In this study, we tried to estimate X as the number of orthopedists and their patients, and Y as the number of judo therapists and their patients. We also tried to estimate the changes in X and Y based on their variation across Japan. Thus, we finally estimated the correlation coefficient as the pseudo cross elasticity, and we hypothesized that a competitive relationship would be indicated by a negative correlation coefficient between judo therapists and physicians.

We performed all statistical analyses using STATA/SE (8.0 for Windows; StataCorp LP, College Station, TX, USA).

Results

The median numbers of judo therapist facilities, orthopedists, patients who visited judo therapists, and patients who visited physicians for musculoskeletal diseases per 100,000 population in each prefecture ($n = 47$) of elderly people are shown in Table 1. The rates of judo therapist facilities (median 16.3, 25th–75th percentiles 12.4–21.0) were comparable with those of orthopedists (median 15.3, 25th–75th percentiles 13.2–17.6).

We observed positive correlations between the rates of judo therapist facilities and patients who visited them (Spearman’s $r = 0.72$, $P < 0.001$; Table 2), and between the rates of orthopedists and patients who visited physicians for musculoskeletal diseases ($r = 0.32$, $P = 0.03$; Table 2).

Finally, the correlation between the patients who visited judo therapist facilities and the patients who visited physicians for musculoskeletal diseases ($r = 0.06$, $P = 0.68$; Table 2) was not negative, but weakly positive. This correlation was still not significant when statistical outliers according to residual analysis were removed (when excluding Wakayama Prefecture $r = 0.10$, $P = 0.49$, $n = 46$; when excluding both Wakayama and Osaka prefectures $r = 0.06$, $P = 0.71$, $n = 45$).

We did not find a correlation between the rates of judo therapist facilities and that of orthopedists ($r = -0.08$, $P = 0.61$, $n = 47$; Table 2), and the other combinations of rates did not indicate significant correlations (Table 2).

Discussion

The results of this study indicate that those Japanese prefectures with more judo therapist facilities have more elderly patients who visit them. In contrast, there was no significant correlation between the numbers of orthopedists and numbers of elderly patients who visited physicians for musculoskeletal diseases. In addition to the fact that we did not observe the expected negative correlation between the rate of judo therapist facilities and that of orthopedists, we also did not observe a negative correlation between the numbers of patients visiting judo therapists and the number of patients visiting physicians.

These results suggest that elderly patients who visit judo therapists for musculoskeletal problems and those who visit physicians for such problems may exhibit different

behaviors with respect to choosing health services. One reason for this difference in behavior might be the different treatment options provided by the national health-insurance program. For example, judo therapists use mainly manual procedures in the treatment of lower back pain but are not able to perform radiological examinations because of the Clinical Radiologist Act. Orthopedists usually start with radiological and neurological examinations followed by medication or, if needed, surgery [25]. Although both judo therapists and orthopedists perform physical therapy, there may be differences in the type of procedure used to treat patients' musculoskeletal problems, such as lower back pain.

A previous study found that more than 50% of patients experiencing lower back pain for the first time sought treatment from a medical doctor by visiting a hospital or clinic, but for patients experiencing recurrent episodes of lower back pain, the rate decreased to 20% [26]. These results indicate that patients with recurrent lower back pain tend to use CAM and that the rate of CAM use increases progressively. However, there are no data on the number of patients with lower back pain or other musculoskeletal problems who first sought judo therapy and then visited physicians for recurrent episodes. In any case, when patients choose their health-care provider according to their own personal preferences, our findings indicate that orthopedists (physicians) and judo therapists are not in competition for elderly patients; each provides a unique service to patients with musculoskeletal problems and can therefore coexist in the same area.

The Japan Judo Therapists' Association surveyed the reasons that patients visit judo therapists and found that accessibility was the most important factor [27]. The different behavior of elderly patients with musculoskeletal problems might be because of a geographical difference in the distribution of each facility. It has been reported that the per capita distribution of judo therapist facilities varies among prefectures and districts [28]. In our previous study, we used the Gini index, which can indicate a disproportionate supply of health services, to investigate the relationship between judo therapist facilities and

Table 1 The numbers and rates of judo therapist (JT) facilities, orthopedists, elderly patients (≥ 70 years old) who visited judo therapists (elderly patients of JTs), and elderly patients who visited physicians for musculoskeletal disease (elderly patients of MDs) among prefectures in Japan ($n = 47$) (median and range in parentheses)

	Number	Rate per 100,000
JT facilities	297 (36–2,528)	16.3 (4.4–55.4)
Orthopedists	270 (113–1,877)	15.3 (9.3–22.3)
Elderly patients of JTs	6,159 (493–78,991)	2,515 (379–8,796)
Elderly patients of MDs	28,000 (11,000–181,000)	11,050 (7,870–15,000)

Musculoskeletal disease refers to rheumatoid arthritis, arthrosis, spondylopathies, lumbago with sciatica, and osteoporosis defined within "Diseases of the musculoskeletal system and connective tissue" of Chap. XIII, and fracture, and dislocation, sprain, and strain defined within "Injury, poisoning and certain other consequences of external causes" of Chap. XIX in ICD-10

Table 2 Spearman's correlation coefficient between the rate of judo therapist (JT) facilities, orthopedists, elderly patients (≥ 70 years old) who visited judo therapists (elderly patients of JTs), and elderly patients who visited physicians for musculoskeletal disease (elderly patients of MDs) among prefectures in Japan ($n = 47$)

	JT facilities	Orthopedists	Elderly patients of MDs
Elderly patients of JTs	0.72 ($P < 0.01$)	-0.07 ($P = 0.63$)	0.06 ($P = 0.68$)
Elderly patients of MDs	0.11 ($P = 0.44$)	0.32 ($P = 0.03$)	-
Orthopedists	-0.08 ($P = 0.61$)	-	-

Musculoskeletal disease refers to rheumatoid arthritis, arthrosis, spondylopathies, lumbago with sciatica, and osteoporosis defined within "Diseases of the musculoskeletal system and connective tissue" of Chap. XIII, and fracture, and dislocation, sprain and strain defined within "Injury, poisoning and certain other consequences of external causes" of Chap. XIX in ICD-10

orthopedic facilities in 47 prefectures. The results indicated that judo therapist facilities were distributed extensively and showed smaller geographical gaps than orthopedic facilities at the prefecture level [29]. When assessing the relationship among different health-care services, it is necessary to consider geographic distribution [13, 30, 31]. In addition, the behavioral patterns of patients in various health care settings are also affected by socioeconomic factors and by the type of health-care provider [32]. Thus, it is plausible that these differences could affect the selection of health-care providers by elderly patients with musculoskeletal problems.

To verify the relationship between patients visiting a judo therapist and patients visiting physicians, the factors which determine the health care-seeking behaviors of patients need to be discussed. The occupational style, medical facilities, and the distance from residence to hospital were known to be factors affecting patients' health care-seeking behavior [33], and we assessed the effects of elderly population, the number of hospitals, and population density of each prefecture on a trial basis. Partial correlation coefficients between the patients who visited judo therapist facilities and patients who visited physicians for musculoskeletal diseases were not significantly negative when controlling for the elderly people's share of the population ($r = 0.21$, $P = 0.17$), the number of hospital per population ($r = 0.10$, $P = 0.51$), and the population per inhabitable area ($r = 0.03$, $P = 0.85$). Additionally, this was still not significant ($r = 0.07$, $P = 0.67$) when all factors were controlled for. Thus, this relationship did not change when key factors affecting patients' health care-seeking behaviors were controlled for.

Leibowitz [34] investigated the demand for health and medical care by examining the relationship between self-care and formal care and observed a decline in the demand for formal care and a rise in self-care in response to the falling prices of over-the-counter drugs. Leibowitz [34] also found a substitution relationship between formal care and self-care. However, if the trends were complementary, the demand for formal care should have also risen.

Applying Leibowitz's definition, we defined a relationship of substitution between judo therapists and orthopedists; in this case, when a district had many patients visiting judo therapist facilities, few patients with musculoskeletal diseases visited physicians. Likewise, we defined a relationship as complementary when a district had a large number of patients who visited physicians and also contained a large number of judo therapist facilities. In this study, following the orthopedists' claim of competition, we expected to find a relationship of substitution, with the data for all prefectures indicating a negative correlation between the rates of judo therapist facilities and of patients who visited physicians. However, we did not find a negative correlation; therefore,

the substitution hypothesis was rejected. At the same time, because we did not find a significant correlation in either direction, a complementary relationship was not supported. A study involving more geographical information would provide better insight into the relationships among judo therapists, orthopedists, and patients with musculoskeletal diseases.

The limitations of this study should be noted. We compared only elderly patients visiting different facilities. When comparing elderly patients and all patients who visited physicians for musculoskeletal disease (the median rate for all patients was 2,590, 25–75%, 2,040–3,160 per 100,000 in the total population), we found that there were more patients suffering from musculoskeletal diseases among the elderly (the rate was 11,050, 25–75%, 9,930–12,760 per 100,000 in the elderly population) [24]. Although the results observed in this study might be generalizable only to the elderly population, the findings have a sufficient impact as far as the total number of musculoskeletal problems is concerned.

Another limitation of this study was the number of "facilities" for judo therapists. It is likely that the number of judo therapist facilities obtained through NTT's website is valid because the total number obtained (21,995) roughly concurred with the number of facilities billing the national health-insurance system (total 23,199 in 2002) [27]. In contrast to the data available for individual orthopedists, we had data only for the number of facilities for judo therapists. However, the number of facilities can be a good proxy for the number of therapists, because in most cases only one judo therapist practices per facility. Using registration data from the Japan Judo Therapists' Association, we estimated that an average of 1.09 therapists work in each facility [27].

Finally, we need to consider the difference between the patients who visited physicians for musculoskeletal diseases and those who visited orthopedists. Although the relationship between orthopedists and judo therapists is the main issue, we cannot isolate the precise relationship between these two kinds of practitioner because the data available from the Patient Survey are for the total number of physicians. We assume that most patients with musculoskeletal diseases will choose an orthopedist when they visit a physician, but some patients with these diseases may visit general practitioners or physicians in other specialties rather than orthopedists. The Patient Survey for 1999 reported that 65% of patients with musculoskeletal diseases visited orthopedists and about 10% visited internists and surgeons [35]. Although it apparently can be assumed that most of our surveyed patients visited orthopedists, one must exercise caution in interpreting this study's results on the relationship between judo therapists and orthopedists.

In addition to these limitations, because this study used 47 prefectures as the units for correlation analysis, there is the possibility of an ecological fallacy. Moreover, it is possible that the category defined as “musculoskeletal disease” used in this study to test the competitive relationship may include conditions for which the judo therapists and physicians do not compete. Thus, this study could have an information bias derived from this definition. In future research, data obtained from a smaller study units and observations at each facility may eliminate these potential fallacies and biases.

We did not find a negative correlation between the number of patients who visited judo therapists and the number of patients with musculoskeletal diseases who visited physicians. Consequently, our results do not support the claims of orthopedists regarding competition for patients between judo therapists and orthopedists. However, the number of judo therapists is increasing rapidly, and the current balance may not persist in the future. A study involving a longitudinal data would give us deeper insight into how the increasing number of CAM practitioners is related to care-seeking behaviors of patients.

Acknowledgments This work was supported in part by a Grant-in-Aid for Scientific Research from the Ministry of Education, Science, Sports and Culture, Japan (Grant number 16659164).

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