



Original Article

Japanese government research grants for Kampo medicine: an overview of 10 years (1997–2017)



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ABSTRACT

Background: Japan has its own traditional medicine called Kampo medicine, but it is relatively unknown compared to traditional Chinese medicine. Therefore, this study examined the current status of the research related to Kampo medicine supported by Japanese government research grants (JGRG).

Methods: Three databases were searched on October 2019: National Institute of Public Health, Grant-in-Aid for Scientific Research and Japan Agency for Medical Research and Development. The search keywords were Kampo medicine, acupuncture, integrative medicine, oriental medicine, and traditional medicine. The final research that satisfied the inclusion criteria were selected and analyzed.

Results: After a comprehensive search of the three databases and removing any duplication research, 2,246 JGRG (985 new proposals) that met the inclusion criteria were selected. The number and amount of JGRG on Kampo medicine have been increasing steadily. The basic research conducted by academic research institutes was mainstream, and the proportion of development research of new Kampo medical technology was low. Most research were non-clinical research and 21 % were clinical research. The largest research institute was the Toyama University and there were many non-clinical, cancer, and *Juzentaihoto* (Japanese herbal medicine) research. The Japanese government grants were funded relatively evenly without bias to specific fields or institutions.

Conclusions: The Japanese government research grants from 1973 to 2017 indicate that research on Kampo medicine which barely had any interest previously, was revived in the 2000s. In particular, it increased sharply in the 2010s, and the research fields were relatively diverse.

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1. Introduction

There are some commonalities and differences for traditional and complementary medicine (T&CM) of East Asia, including Korea, Japan, China, Taiwan, and Mongolia.^{1–3} Although they have something in common in terms of traditional concepts or five-element theories of East Asian natural philosophy, such as yin and yang, they differ greatly in terms of the medical delivery system and insurance systems.^{2,4}

Among them, Kampo Medicine, traditional Japanese medicine including not only herbal medicine but also acupuncture and moxibustion, has been fully integrated with both biomedicine and has

been performed by medical doctors since the abolition of the TM doctor system in 1881.² In 2009, Kampo drugs have been prescribed to 1.34 % of all patients enrolled in the Japan's National Health Insurance, but the utilization rate of entire Kampo medical services could not be found.⁵ On the other hand, utilization rates of traditional medical services in Korea and Taiwan were 25.5 % and 26.8 %, respectively.^{5,6}

Meanwhile, the Japanese government rarely supports research funding under the separate category of Kampo medicine, and it is difficult to classify Kampo medicine into categories to identify the status of Japanese government research grants, even though Kampo medicine research is being conducted. However, 12 % of clinical practice guidelines (CPGs) published in Japan by 2015 contained Kampo CPGs. Meanwhile, the Japanese government rarely supports research funding under the separate category of Kampo medicine, and it is difficult to classify Kampo medicine into categories to identify the status of Japanese government research grants, even though Kampo medicine research is being conducted. However, 12 % of clinical practice guidelines (CPGs) published in Japan by 2015

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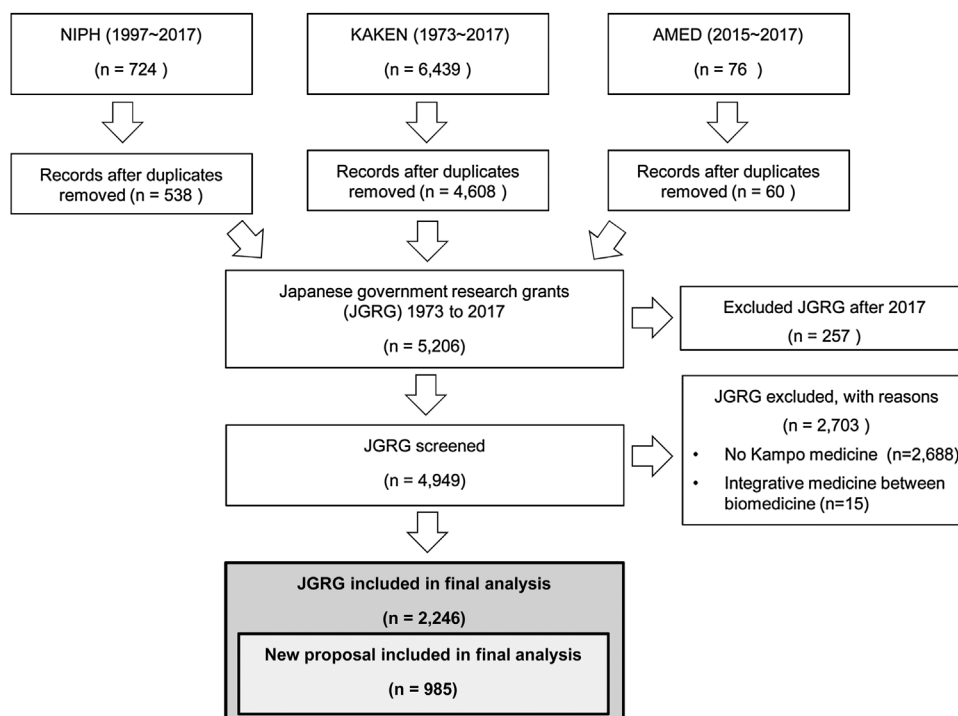


Fig. 1. Selection of Japanese government research grants. AMED, Japan Agency for Medical Research and Development; NIPH, National Institute of Public Health; JGRG, Japanese government research grants; KAKEN, Grant-in-Aid for Scientific Research.

contained Kampo CPGs.⁷ In addition, a few reports on a marketing approval process and industry-academia-government collaboration consortium for Kampo medicines have been published.^{8,9}

In this regard, it is necessary to determine the current state of Japanese government research grants (JGRG) of Kampo medicine in Japan to comprehend the current state of Kampo medicine, which is one of the traditional medicines in East Asia. Therefore, this study examined the current status of research on Kampo medicine funded by the Japanese government, using the Grant-in-Aid for Scientific Research (KAKEN), National Institute of Public Health (NIPH) and Japan Agency for Medical Research and Development (AMED) databases.

2. Methods

2.1. Data source and search

The methodology of systematic review was partially applied. First, the Japanese government website and three representative databases were searched to identify Japanese government research support. The KAKEN database (<https://kaken.nii.ac.jp>) contained research sponsored by Ministry of Education, Culture, Sports, Science and Technology (MEXT) from 1973, and the NIPH database (<https://mhlw-grants.niph.go.jp/niph/search/NIST00.do>) contained research sponsored by the Ministry of Health, Labour and Welfare (MHLW) from 1997, and the AMED database (<https://www.amed.go.jp>) contained research sponsored by multiple ministries (MHLW, MEXT and Ministry of Economy, Trade and Industry (METI)) from 2015. Owing to the slow upload time of the website, however, the latest data available is incomplete up to two years ago.

The databases the NIPH and KAKEN were searched in February 2017 and 2019, and AMED were searched in October 2019. Data from the second search in 2019 were obtained up to 2017. That is, as mentioned above, not all 2017 data were acquired.

The search keywords were Kampo medicine, acupuncture, integrative medicine, oriental medicine, and traditional medicine.

2.2. Study selection and data collection

After a comprehensive search using multiple keywords, studies on non-Kampo medicine and biomedical integration medicine were excluded. A full report or abstract for data collection is available.

Finally, 2246 JGRG (new proposal and continued) were selected, and 985 new proposal were selected when the multiyear proposal was considered as a single proposal (Fig. 1).

In addition, the study information of database, title, grants name, grant categories, university conducting research, research year, period, research expenses, research purpose, and intervention were collected.

2.3. Statistical analysis

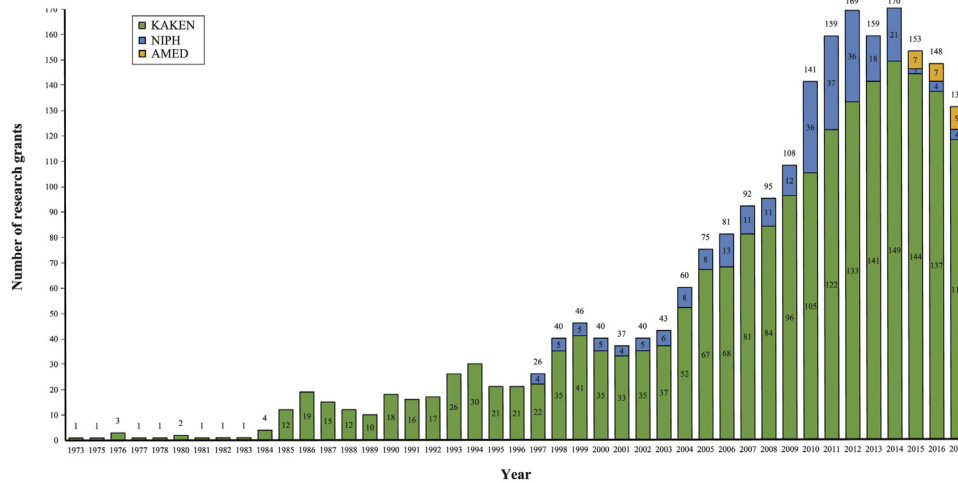
Descriptive analysis was used to describe the frequency and percentage of current JGRG for Kampo Medicine in Japan by year, database, category, and university. Statistical analyses were conducted using Stata/MP version 15 (StataCorp LP, College Station, Texas, USA).

3. Results

3.1. The Japanese government research grants by year

The total number of JGRG has exceeded 10 cases per year since 1985 and more than 100 cases per year in 2009. There were differences in the percentages per year, but more than 74 % were supported by KAKEN. And with the exception of 2010, more than 79 % new proposal were supported by KAKEN. Meanwhile, after being first funded by the NIPH in 1997, the NIPH supported the largest number of JGRG in 2010 ($n = 32$, 46.38 % of total in 2010) during the investigation, with a total of 69 new proposal (Fig. 2A, Supplement Table 1).

(A) Number of research grants



(B) Total amounts of grants

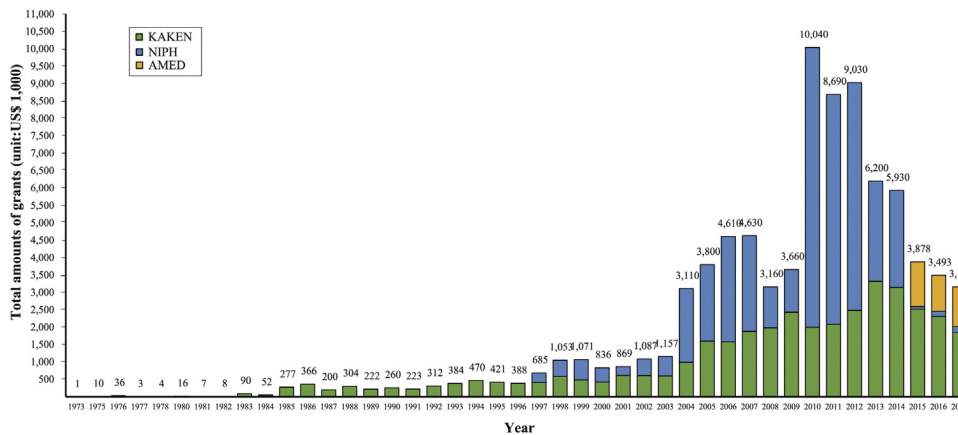


Fig. 2. The trend of Japanese government research grants from 1973–2017. (A) Number of research grants; (B) Total amounts of grants. The values are provided in Supplement Table 1 and 2. AMED, Japan Agency for Medical Research and Development; NIPH, National Institute of Public Health; KAKEN, Grant-in-Aid for Scientific Research.

Table 1
Major Affiliations receiving Japanese government research grants.

Total (new proposal and continued)			new proposal		
Affiliation	n	%	Affiliation	n	%
Total	2246	100%	Total	985	100%
1 Toyama University	215	9.53%	Toyama University	89	9.04%
2 Meiji University of Integrative Medicine	120	5.32%	Meiji University of Integrative Medicine	66	6.70%
3 Tohoku University	92	4.08%	Tohoku University	39	3.96%
4 Keio University	86	3.81%	Keio University	37	3.76%
5 Kitasato University	78	3.46%	Tokyo University	34	3.45%
6 Tokyo University	70	3.10%	Kitasato University	30	3.05%
7 Kanazawa University	62	2.75%	Kanazawa University	25	2.54%
8 Osaka University	55	2.44%	Osaka University	25	2.54%
9 Kyoto University	51	2.26%	Kyoto University	23	2.34%
10 Nagoya City University	39	1.73%	Chiba University	23	2.34%
11 Tsukuba University	39	1.73%	Nagoya City University	20	2.03%
12 Chiba University	40	1.77%	Tsukuba University	19	1.93%
13 Showa University	32	1.42%	Showa University	14	1.42%
14 Kyushu University	30	1.33%	Nihon University	12	1.22%
15 Juntendo University	30	1.33%	Kyushu University	11	1.12%
16 Others	1,207	53.50%	Others	518	52.59%

The total funding amount of JGRG was more than 200 thousand dollars (1 US dollar = 100 yen) in 1985, over 1000 thousand dollars in 1998, and was the highest at 10,040 thousand dollars in 2010. The amount funded per JGRG was 168 thousand dollars for the NIPH grants, which was significantly higher than the 19 thousand dollars for the KAKEN grants (Fig. 2B, Supplement Table 2).

3.2. Major Affiliation of receiving Japanese government research grants

The largest recipients of JGRG were Toyama University (total [new proposal and continued]: 9.53 %, new proposal: 9.04 %), followed by Meiji University of Integrative Medicine (total [new

Table 2
Characteristics of the Japanese government research grants.

Type (N = 2246)	n	%
Non-Clinical	1,778	79.2%
Clinical	468	20.8%
RCT	78	3.5%
Non-RCT	390	17.7%

proposal and continued]: 5.32 %, new proposal: 6.70 %), Tohoku University, Keio University, Kitasato University, and Tokyo University. The top six universities each received more than 3%, and their total was approximately 30 %. In other words, Toyama University, which received the most, was less than 10 %, and many universities and research institutes received JGRG for Kampo Medicine relatively evenly (Table 1).

3.3. Major research fields and types

Basic research field accounted for 48.45 % (n = 1077) of the total research funded by KAKEN. The next major area, the young scientist research field, accounted for 14.48 % (n = 322). The major research fields funded by NIPH were in the order of general research on ensuring health and safety (n = 96, 37.65 %) and welfare science basic research (n = 74, 29.02 %).

The most common area of research was general internal medicine, each remaining division was less than 5 %. Only 15 % of the total research was on product development. Clinical research comprised 21 % of the total, of which only 16.67 % were randomized clinical trials (Table 2). Although cancer was the most funded disease, it was only 6%, which has been widely funded by various diseases. Among the research that can be identified as target herbal formulas of the research, Juzentaihoto (Sipjeondaebotang in Korean, Shiquandabu-tang in Chinese) was the most studied (Table 3).

4. Discussion

This study analyzed the current status of the research on Kampo medicine funded by JGRG. Since the 2000s, research on Kampo medicine has been increasing steadily, and various academic research institutes are conducting research in various fields.

Table 3
Major herbal formulas (or herb) researched in Japanese government research grants.

Herbal formulas (or Herb) (N = 1003)			n	%
Japanese name	Korean name	Chinese name		
Juzentaiho-to	Sipjeondaebotang	Sipjeondaebotang	68	6.78%
Daikenchu-to	Daegunjoong-tang	Dajianzhong-tang	49	4.89%
Yokukan-san	Ukgansan	Yigan-tang	45	4.49%
Hochuekki-to	Bojungikgi-tang	Buzhongyiqi-tang	42	4.19%
Glycyrrhiza spp.			38	3.79%
Rikkunshi-to	Yukgunja-tang	Liujunzi-tang	34	3.39%
Keishibukuryo-gan	Gyejibokryeong-hwan	Guizhifuling-wan	27	2.69%
Sairei-to	Siryongtang	Chailing-tang	24	2.39%
Kakkon-to	Galgeun-tang	Gegen-tang	23	2.29%
Goshajinki-gan	Uchashinki-hwan	Niucheshenqi-wan	23	2.29%
Tokishakuyaku-san	Dangguijakyak-san	Danguishaoyao-san	20	1.99%
Ephedra spp.			16	1.60%
Aconitum spp.			14	1.40%
Gorei-san	Oryeong-san	Wuling-san	14	1.40%
Choto-san	Jodeung-san	Diaoteng-san	13	1.30%
Shosaiko-to	Sosiho-tang	Xiaochaihu-tang	13	1.30%
Koso-san	Hyangso-san	Xiangsu-san	13	1.30%
Ninjinyoei-to	Renshenyangrong-tang	Insamyangyoung-tang	12	1.20%
Hachimijio-gan	Baweidihuang-wan	Palmijihwang-Whan	12	1.20%
Orengedoku-to	Hwanglyeonhaedok-tang	Huanglianjiedu-tang	12	1.20%

This may be interpreted as a resurrection of Kampo medicine. Kampo medicine was originally banned by the Japanese government in 1876, which required all physicians to study Western medicine, but Kampo medicine was integrated into the core medical curricula in 2001.^{10,11} This change in medical education appears to have influenced the trend of steadily increasing research since 2004. Afterwards, Japanese pharmacy schools have also started teaching Kampo medicine in 2006, Kampo medicine education has been fully incorporated into the curricula of all pharmacy schools.¹² The increased attention and utilization desire of Kampo medicine due to the inclusion of Kampo medicine in the medical and pharmacy school curriculum may have contributed to the explosion of Japanese government research grants around 2010 which was primarily derived from the replacement of the Japanese government promoting integrative medicine with a view of extending healthy life expectancy.¹³

The number of randomized controlled trial (RCT) in the present study result was low compared to previous studies that reported 106 RCT among 135 Kampo medicine trials.¹¹ Many clinical studies seem to be funded by private research funds instead of JGRG. Because Kampo medicine already has a foundation in insurance and industry, private research is expected to be active. That is, Kampo herbal formulas have been included in the Japanese National Health Insurance drug list from 1967 to 1986 and a total of 148 formulas are insured now, and some Japanese pharmaceutical companies have been conducting clinical trials in Japan and the USA.^{11,14} Insurance coverage also could be a reason why non-clinical research is dominant than clinical research in Japan, and pharmaceutical companies are focusing on international clinical research. Instead, non-clinical research focusing on the mechanism or safety of Kampo medicine are important topic as domestic research. It is also pointed out that the difficulties applying traditional pattern diagnosis to RCTs evaluating efficacy of Kampo medicine.¹⁴

Previous research can provide some information on the status of government funds in China and Korea.^{15–17} A direct comparison is not possible because of the different research objectives and hypotheses, but these East Asia countries have something in common that JGRG tended to provide less funding to the pharmaceutical industry compared to academia, with a focus on herbal formulas.

This study had some limitations. First, some of the research may have been missed because Kampo medicine research was selected and classified by related keyword and the database was

not uploaded quickly. Second, there is the possibility that some classifications may have been incorrect because some research did not have result reports attached to the database. Third, the percentage of the JGRG for Kampo medicine in total number of JGRG and the total amount of funding each year could not be reported with limited data.

Nevertheless, this study is meaningful in that there have been studies on other traditional medical systems in China, Korea, and Japan, but there are no reports on the status of JGRG. In addition, information on JGRG for Kampo medicine will help to understand Japanese traditional medicine in the context of East Asian traditional medicine. In Korea, some pointed out the shortcomings of the exclusionary pluralist medical system, and changed to the Japanese subjugated medical system. These results can also be used to determine what role government should play in preserving traditional medicine when the system is changed.

In conclusion, analyzing JGRG from 1973 to 2017, research on Kampo medicine started to receive much interest in the 2000s. In particular, it increased sharply in the 2010s, and the research fields were relatively diverse. East Asian countries have used traditional medicine for the treatment of symptoms and diseases, and this medicine still has influence in unique ways. On the other hand, most countries have their own systems because each country has different situations. Therefore, the status of JGRG for Kampo medicine will help establish the policy on traditional medicine.

Authors' contributions

MK Hyun conceptualized and designed the study. HY Yoon searched, collected and organized the data. MK Hyun performed the data analysis. MK Hyun, T Yoshino and MJ Park interpreted the result. MK Hyun wrote the paper with input from all authors, MK Hyun and T Yoshino revised the manuscript. All authors approved the final manuscript.

Conflict of interests

The authors have no conflicts of interest to declare with respect to the authorship and/or publication of this article.

Funding

Not applicable.

Data availability

The final data used in the Fig. 2 provided as supplement tables. The other data will be made available upon request.

Supplementary material

Suppl. 1. Number of research grants, and Suppl. 2. Total amounts of grants can be found, in the online version, at doi:<https://doi.org/10.1016/j.imr.2019.11.006>.

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