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Japan's Share of Published Research in Ophthalmology

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Purpose: This study was conducted to determine Japan's share of published research in ophthalmology during the last decade.

Methods: Ophthalmology journals with higher impact factors were accessed through the Medline database to elicit the number of articles published in 1991–2000 that originated in various countries, including Japan. The proportion of articles with a higher grade of evidence (randomized controlled trials/clinical trials, cohort studies, and case-control studies) was determined for Japan and compared with the average values of the total articles published in these journals. In addition, the percentage of published research from the 20 top-ranking countries was calculated, showing the trend over time.

Results: Of the total articles (21,327), Japan's share in the selected ophthalmology journals was 6.5% (1,387 articles), ranking third in the world, following the USA (51.5%) and the UK (11.3%). The recent increase in the share was statistically significant for Japan ($P = .01$). However, the proportionate value of clinical research evidence was lower for Japan-originated articles than the average value for the total clinical research articles in these journals.

Conclusions: Appropriate measures should be taken in the ophthalmology field in Japan to increase the number of clinical research papers with a higher grade of evidence. **Jpn J Ophthalmol 2003;47:221–224**

Key Words: Grade of evidence, impact factor, Medline, published ophthalmology research.

Introduction

According to a recent report, Japan ranks second in the publication of research articles (5.3% of total) in the biomedical field following the USA (31.3%).[1] However, in another survey, Japan ranked 4th (3.1% of total articles) and 14th for basic science and general medical journals (0.7% of total articles), respectively.[2,3] So far, little is known about Japan's share of articles in different medical categories of journals with high impact factors. This study was designed to determine Japan's share of published research in the field of ophthalmology during the last decade and to compare it with other countries.

Materials and Methods

The 10 ophthalmology journals with the highest impact factors for the year 2000 (*Investigative Ophthalmology and Visual Science*, *Ophthalmology*, *Survey of Ophthalmology*, *Archives of Ophthalmology*, *Journal of Cataract and Refractive Surgery*, *Journal of Refractive Surgery*, *Vision Research*, *British Journal of Ophthalmology*, *American Journal of Ophthalmology*, and *Current Eye Research*) were selected from the "Ophthalmology" category of journals established by the Institute for Scientific Information (ISI Journal Citation Reports 2000, Philadelphia, PA, USA) to obtain the relevant data. The Medline database was searched in June 2002 to elicit the number of journal articles originating in different countries in

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1991–2000. Journals from which articles were not available in the Medline database for at least 5 years were excluded. First, the proportion of the Japanese contribution to each of the journals was determined to calculate the percentage of the Japanese contribution in the ophthalmology field. The proportion of contribution by each of the countries was then calculated and ranked in descending order. We also searched the Medline database based on these journals to elicit the proportion of randomized controlled trials (RCTs)/clinical trials and cohort/case-control studies compared to the total articles for all countries as a whole, and separately for Japan alone. The shares of the 20 top-ranking countries were also calculated for each year (1991–2000) to examine the trend during this decade.

Statistical Analyses

Nonparametric tests for trend were performed using STATA 7.0 (STATA Corporation, College Station, TX, USA) to determine any significant change in the contributions by different countries over this period of time. Tests of significance were two-tailed and a value of $P \leq .05$ was considered significant.

Results

In total, 21,327 articles were published in the selected ophthalmology journals from 1991 through 2000. Source data were available for 20,568 (96.4%) articles. Japan's average share of these articles was 6.5% (1,387 articles) with a range from 0.7% to 13.3% (Figure 1) in the different journals. On an annual basis, Japan's proportional share in this field increased from 3.7% in 1991 to 8.9% in 2000 (Figure 2). This trend was statistically significant ($P = .01$).

Table 1 shows the 20 top-ranking countries in terms of share of total articles for each country. The USA contributed 51.5% of the total (10,977 articles) and ranked first among all the countries followed by the UK (11.3%), Japan (6.5%), and Germany (4.4%). In the trend analysis, in addition to Japan, the following countries showed a significantly positive trend: Germany ($P = .01$), Australia ($P = .02$), France ($P = .03$), Italy ($P = .01$), Spain ($P = .02$), Sweden ($P = .03$), Switzerland ($P = .01$), India ($P = .01$), Austria ($P = .03$), China ($P = .05$), and South Korea ($P = .01$). On the other hand, the USA's share showed only a significantly negative trend ($P = .01$) in the last decade.

As a whole, the proportion of RCTs/clinical trials was 5.3% (1,140 articles) in the selected ophthalmology journals, while for Japan, it was 3.6% (50 articles). Moreover, a significantly positive trend was found for RCTs/clinical trials as a whole but not for Japan (Figure 3). Japan's contribution was also smaller for case-control/cohort studies than the average values for all other countries (1.0% vs. 2.4%).

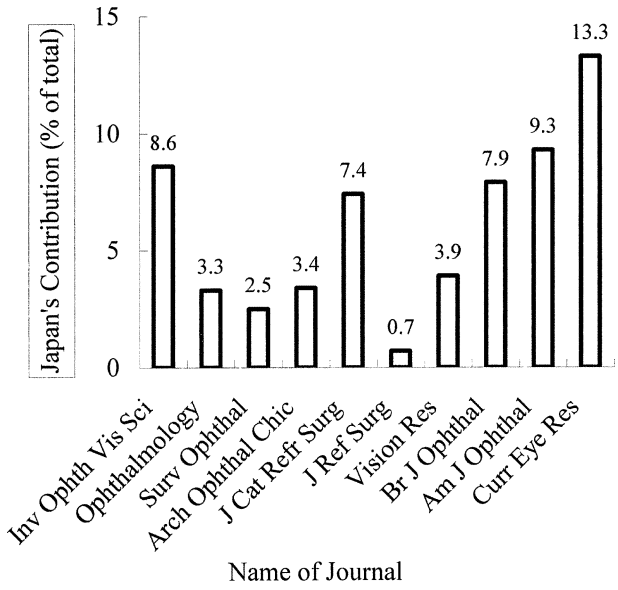

Figure 1. Japan's contribution to the selected ophthalmology journals in 1991–2000. *Inv Ophthal Vis Sci* (*Investigative Ophthalmology & Visual Science*), *Ophthalmology* (*Ophthalmology*), *Surv Ophthal* (*Survey of Ophthalmology*), *Arch Ophthal Chic* (*Archives of Ophthalmology*), *J Cat Refr Surg* (*Journal of Cataract and Refractive Surgery*), *J Ref Surg* (*Journal of Refractive Surgery*), *Vision Res* (*Vision Research*), *Br J Ophthal* (*British Journal of Ophthalmology*), *Am J Ophthal* (*American Journal of Ophthalmology*), *Curr Eye Res* (*Current Eye Research*).

Discussion

This study indicated that Japan's share of articles in ophthalmology during the decade averaged 6.5% in the selected journals and that Japan ranked third among all countries. The share for Japan was higher in ophthalmology journals than in basic science (3.1%) and general medical (0.7%) journals[2] with high impact factors. A positive trend in share was observed for Japan as well as for a number of other countries. There is no doubt that the USA leads all other countries in the publication of medical research.[1,3–5] However, its share for research articles in ophthalmology declined from 61.1% in 1991 to 43.7% in 2000. The USA showed a similar negative trend for basic science and general medical research articles.[3]

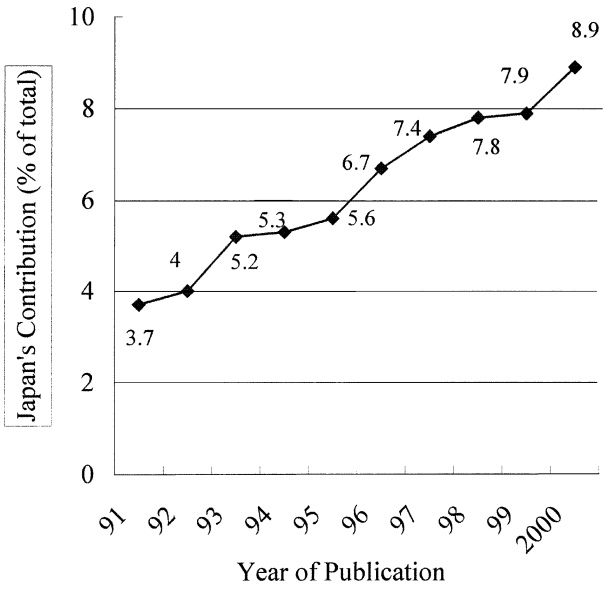

Figure 2. Trend in publication of ophthalmology research articles in Japan during 1991–2000. *P = .01, nonparametric test for trend.

Table 1. Share of Ophthalmology Articles for 20 Top-ranking Countries*

	Share of Articles Published by Each Country		
Country†	1991–2000 (N = 21,327)	1991 (N = 1,760)	2000 (N = 2,676)
USA↓	51.5	61.1	43.7
UK	11.3	11.7	12.3
Japan↑	6.5	3.7	8.9
Germany↑	4.4	2.2	6.5
Canada	3.0	2.1	2.8
Netherlands	2.5	2.6	2.0
Australia↑	2.2	1.4	2.1
France↑	1.6	1.4	2.1
Israel	1.5	1.6	1.1
Italy↑	1.5	0.9	1.9
Spain↑	1.0	0.3	1.1
Sweden↑	1.0	0.8	1.0
Switzerland↑	1.0	0.5	1.0
India↑	0.8	0.3	1.5
Finland	0.7	0.5	0.7
Austria↑	0.7	0.5	0.8
Saudi Arabia	0.6	0.5	0.4
China↑‡	0.5	0.2	1.6
Denmark	0.5	0.4	0.3
South Korea↑	0.4	0.0	0.8

*Ranking based on the total number of articles published during 1991–2000. Data does not total 100% because percentages of other countries are not included.

↑: Share of articles increased significantly over time period, ↓: Share of articles decreased significantly over time period.

‡Data for China include Hong Kong's share.

The proportion of articles with a higher grade of evidence (RCTs, clinical trials, case-control studies, and cohort studies) from Japan was smaller than the average for all other countries. A recent study also documented that Japan lagged behind other developed countries in conducting randomized controlled trials,[4] although it is ranked second in the world[1] in terms of total number of articles in the medical field.

There are some limitations to this study. The number of papers elicited from these journals is only a gross estimate of the proportion of Japan's contribution in ophthalmology journals with a higher impact factor. The absolute number of ophthalmology journal articles originating from Japan is certainly different from our findings, because there are many more journals other than the ones we dealt with in this study. However, the proportion of contributions obtained here is likely to reflect the real situation.

In conclusion, in the ophthalmology field the number of Japanese clinical research articles with a higher grade of evidence was smaller than for other countries, even though Japan's share of research article output was higher in this field than in other medical categories. Remedial measures should be taken in the ophthalmology field in Japan to increase the number of clinical research articles with a higher grade of evidence.

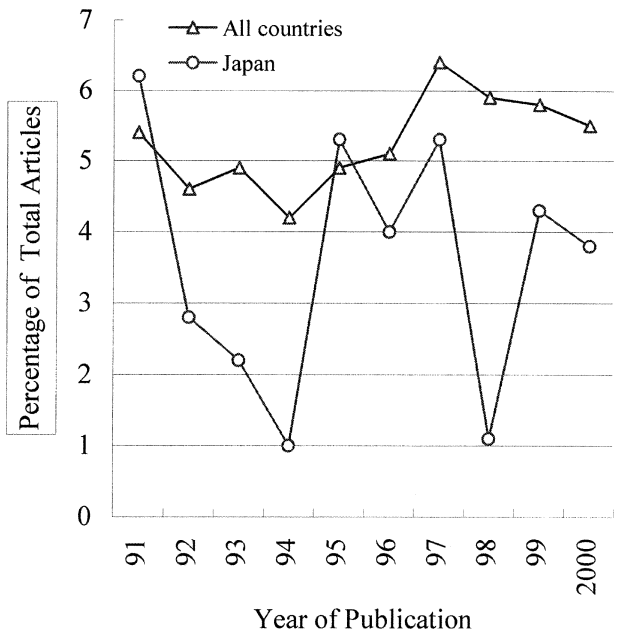

Figure 3. Trend of percentage of randomized controlled trials/clinical trial articles from all countries compared to Japan share. P = .05, nonparametric test for trend for all countries. P = .90, nonparametric test for trend for Japan. △ All countries, ○ Japan.

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