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Bibliographic Analysis of Primary Health Care Publications in the Asian Pacific Region: An Analysis of the Web of Science Database from 2011 to 2023

Chun-Feng Huang [1,2,3], Brian Bih-Jeng Chang [4], I-Hsuan Hwang [5], Yu-Chun Chen [2,6,7] and Shinn-Jang Hwang [1,2,*]

[1] Department of Family Medicine, En Chu Kong Hospital, New Taipei City, Taiwan
[2] Faculty of Medicine, School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan
[3] Department of Leisure Services Management, Chaoyang University of Technology, Taichung, Taiwan
[4] Brian's Family Doctor Clinic, San Chong, New Taipei City, Taiwan
[5] Department of Quality Management, Cheng-Hsin General Hospital, Taipei, Taiwan
[6] Department of Family Medicine, Taipei Veterans General Hospital, Taipei, Taiwan
[7] Big Data Center, Taipei Veterans General Hospital, Taipei, Taiwan
* Correspondence: 01952@km.eck.org.tw; Tel.: +886-2-26723456#1715; Fax: +886-2-26730920

Abstract: Emphasis on primary health care (PHC) is the most efficient and economical approach to achieving universal health coverage. The aim of the study is to examine PHC publications from 2011 to 2023 in the Asian Pacific region (APR) using the Web of Science (WoS) database. Academic papers in the WoS PHC subject category published in the APR from 2011 to 2023 were retrieved and analyzed. A total of 4,283 papers were published in the WoS PHC category from APR onwards. The annual number of published papers and their citations increased from 2011 to 2023. Australia led PHC publications in APR with 3,049 publications (71.19% of APR regional output). New Zealand had the highest number of citations per paper (13.76) and the highest mean impact factor (3.23±1.80). Publications in the WoS PHC category also covered a wide range of topics, including Medicine General Internal (64.77%), Health Care Sciences Services (21.88%), Health Policy Services and Public Environmental Occupational Health (21.36%), demonstrating the breadth of PHC research. Australia dominates the output of PHC publications in the APR. Australian Family Physician and Australian Journal of Primary Health are the leading journals publishing PHC papers in the APR.

Keywords: family medicine; general practice; impact factor; primary health care; Web of Science

1. Introduction

Healthcare systems in most countries have faced significant challenges over the past decade. The global trend is driven by two factors: rising healthcare costs and declining healthcare outcomes as population age. Improving the role of primary health care (PHC) within the healthcare system, as well as the training of health professionals for their roles, improves the performance of the healthcare system. Improving PHC, will reduce health care costs and improve the health of populations [1]. This makes strengthening PHC a global strategy for ensuring sustainable health care [2]. It is therefore important that international cooperation examines how PHC policies are put into practice. Every healthcare system must prioritize and deliver high-quality PHC for all.

The basic goal of family medicine and general practice is to provide comprehensive PHC services. Family physicians are often the first point of contact for people seeking medical care and provide a comprehensive approach to PHC. Family physicians treat a wide range of health conditions and prioritize preventive measures to improve the overall health of the population [3–5]. As a result, the World Organization of Family Doctors (WONCA) has sought to help countries develop national leadership in primary care and family medicine through the establishment of national academies and colleges of family physicians [6,7].

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Web of Science (WoS), a powerful bibliometric analysis tool, has been established since 2004. The WoS incorporates several citation databases, including the Science Citation Index-Expanded (SCI-E), the Social Sciences Citation Index (SSCI). Clarivate Analytics now owns and operates WoS, and also provides the Journal Citation Report (JCR) for use by academic researchers [8–10]. To highlight the importance of research in family medicine, primary care, and general practice, the WoS introduced a new subject category "Primary Health Care" in 2011 to increase the publication and recognition of research in PHC [11,12].

Despite the considerable diversity of healthcare systems in the Asia-Pacific region (APR), this research endeavor utilized the extensive features of the WoS database to examine PHC publications in the APR from 2011 to 2023 [7,13].

2. Materials and Methods

The WoS database was accessed via the website of the Taipei Veterans General Hospital Library on 25 February 2023. In the first step, publications in the WoS subject category of PHC worldwide were evaluated. Publications in SCI-E and SSCI were searched from 1 January 2011 to 31 December 2023 (WoS subject category of Primary Heath Care initiated in 2011). The number of publications from each country/region worldwide was obtained. In the second step, the types of publications, including articles, letters, reviews, proceedings, editorials and notes, but not meeting abstracts and corrections, were included in the analyses. Publications in the APR were then retrieved and included in the final analysis.

To analyze the citation counts of published articles and the impact factors of published journals, we also obtained the citation count of each article from WoS and the impact factor of published journals from 2022 JCR. In this study, WoS publications and JCR impact factors were linked using SAS version 9.4 (SAS Corporation, Cary, NC, USA). The results of the first and second stages were expressed as descriptive data (number, percentage, range, mean and standard deviation). ANOVA and Student t-test were used to assess statistically significant differences of mean impact factors among different countries/regions (SPSS version 20.0, SPSS Inc., Chicago, Illinois, USA). A p-value <0.05 was considered statistically significant (2-tailed tests).

3. Results

Table 1 shows the twenty-five most productive countries in the PHC publication. The countries contributing most to global productivity are the United States, the United Kingdom, Canada, Australia and Spain. Among these twenty-five countries with significant productivity, China, New Zealand, Japan and Singapore in the APR ranked 12th, 17th, 21st and 25th in terms of PHC publication worldwide. According to the data presented in Table 1, the total number of PHC publications worldwide during the specified period was 33,673. A total of 14,136 papers (41.98%) were published in the North American region, which includes the United States and Canada. Of these, 10,744 were published in the United States and 3,392 in Canada. Approximately 8,986 publications (26.69%) were published in the European region, which includes England, Spain and the Netherlands.

Table 1. Top twenty-five prolific countries/regions that published papers in the Web of Science Primary Health Care Categories from 2011 to 2023 in the world.

Country/Region	Articles published	%
USA	10744	31.91
ENGLAND	5299	15.74
CANADA	3392	10.07
AUSTRALIA	3049	9.06

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SPAIN	2184	6.49
NETHERLANDS	1503	4.46
SCOTLAND	831	2.47
SWEDEN	595	1.77
GERMANY	573	1.70
DENMARK	570	1.69
NORWAY	444	1.32
PEOPLES R CHINA	428	1.27
FRANCE	369	1.10
BELGIUM	366	1.09
IRELAND	305	0.91
WALES	264	0.78
NEW ZEALAND	257	0.76
SWITZERLAND	226	0.67
ITALY	213	0.63
FINLAND	210	0.62
JAPAN	193	0.57
BRAZIL	169	0.50
PORTUGAL	166	0.49
TURKEY	160	0.48
SINGAPORE	150	0.45

PHC publications in the APR are shown in Table 2. There was a total of 4,283 publications. The APR achieved the third highest position in terms of publication output, accounting for about 12.71% (4,283/33,673) of the total world output. Australia emerges as the leading country for PHC publications, accounting for 71.19% of APR publication output, followed by China, New Zealand, Japan, Singapore, Malaysia, Taiwan and South Korea. The number of PHC publications in the APR increased gradually from 2011 to 2023, with a decrease from 2017 to 2019, followed by an increase again. The number of citations to PHC publications increased steadily, peaking at around 6,700 at the end of 2022 (Figure 1).

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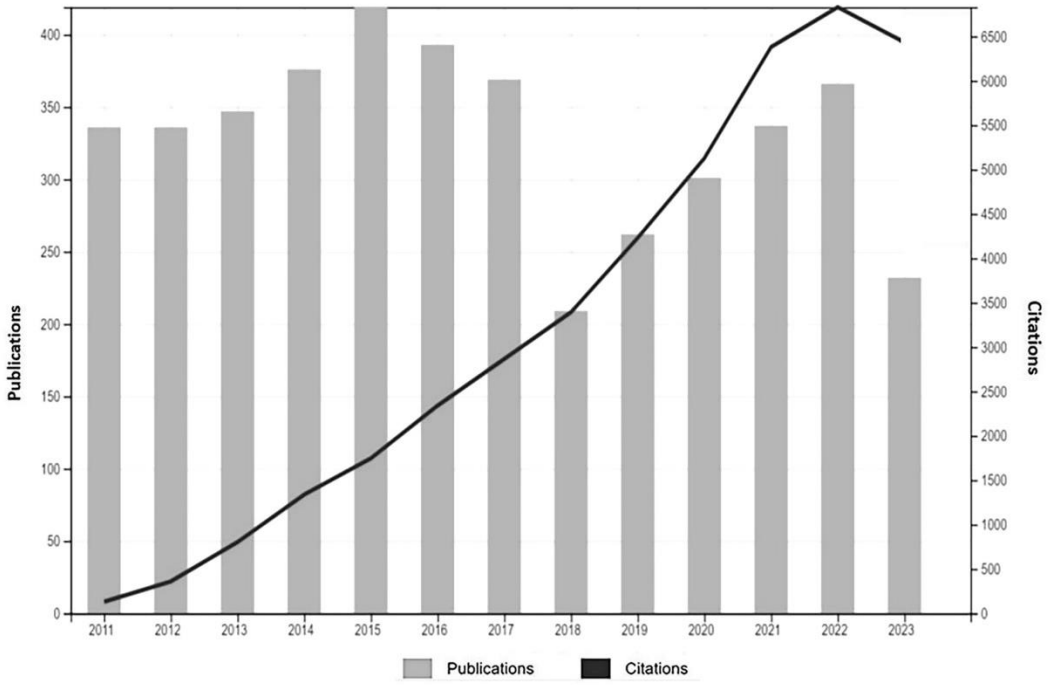

Figure 1. The number of academic papers published in the Web of Science Primary Health Care Category in the Asian Pacific Region from 2011 to 2023 and its citation trends.

Table 2. Ranking of countries/regions that published papers in the Web of Science Primary Health Care Categories from 2011 to 2023 in the Asian Pacific Region.

Country/Area	Articles published	%
AUSTRALIA	3049	71.19
PEOPLES R CHINA	428	9.99
NEW ZEALAND	257	6.00
JAPAN	193	4.51
SINGAPORE	150	3.50
MALAYSIA	135	3.15
TAIWAN	92	2.15
SOUTH KOREA	77	1.80
THAILAND	51	1.19
INDONESIA	28	0.65
PHILIPPINES	19	0.44
VIETNAM	14	0.33
BANGLADESH	13	0.30
FIJI	5	0.12
MONGOLIA	1	0.02
MYANMAR	1	0.02

The distribution of publications in the PHC category across different WoS subject categories (Table 3) highlights the broad scope of PHC research in this region. A significant number of publications in the PHC category are also indexed under the categories of Medicine General Internal (64.77%), Health Care Sciences Services (21.88%), and Health Policy Services (21.37%). This suggests a wide range of research topics, including not only clinical aspects, but also health service delivery, policy considerations and public health implications related to PHC.

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Table 3. Web of Science categories coding in a total 4,283 selected papers published in Primary Health Care.

Web of Science category	Articles published	%
Primary Health Care	4283	100.00
Medicine General Internal	2774	64.77
Health Care Sciences Services	937	21.88
Health Policy Services	915	21.36
Public Environmental Occupational Health	915	21.36
Endocrinology Metabolism	210	4.90
Respiratory System	177	4.13
Orthopedics	85	1.99
Sport Sciences	85	1.99
Nutrition Dietetics	4	0.09

Tables 4 and 5 highlight the influential authors and institutions driving PHC research in the APR. Authors such as Van Driel, Mieke, Britt, Helena, and Magin, Parker from Australia, and Zwar, Nicholas A. from New Zealand, are among the most prolific contributors, reflecting the strong research culture and focus on primary care in these countries. Australian institutions dominate the list of top publishers, with the University of Sydney, the University of Melbourne, and Monash University leading the way. These institutions have established robust PHC research programs, attracting significant funding and fostering collaborations with clinicians and policy makers.

Table 4. The twenty most prolific authors who published papers of Primary Health Care from the Web of Science Category in Asian Pacific Region from 2011 to 2023.

Author name	Articles published	%
Van Driel, M.	54	1.26
Britt, H.	48	1.12
Magin, P.	47	1.10
Zwar, N. A.	46	1.07
Harris, M. F.	44	1.03
Mazza, D.	43	1.00
Emery, J. D.	43	1.00
Senior, T.	41	0.96
van Weel, C.	39	0.91
Harrison, C.	38	0.89
Morgan, S.	33	0.77
Russell, G.	31	0.72
Dennis, S. M.	30	0.70

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Halcomb, E.	27	0.63
Temple-Smith, M.	27	0.63
Charles, J.	27	0.63
Goodyear-Smith, F.	26	0.61
Furler, J. S.	26	0.61
Glasziou, P.	26	0.61
Sturgiss, E.	26	0.61

Table 5. Top twenty prolific institutes published papers articles in the Web of Science Primary Health Care Category in Asian Pacific Region from 2011 to 2023.

Journal name	Paper published	%
UNIVERSITY OF SYDNEY	486	11.35
UNIVERSITY OF MELBOURNE	433	10.11
MONASH UNIVERSITY	385	8.99
UNIVERSITY OF QUEENSLAND	299	6.98
UNIVERSITY OF NEW SOUTH WALES SYDNEY	289	6.75
FLINDERS UNIVERSITY SOUTH AUSTRALIA	167	3.90
NSW HEALTH	163	3.81
AUSTRALIAN NATIONAL UNIVERSITY	157	3.67
UNIVERSITY OF NEWCASTLE	156	3.64
UNIVERSITY OF WESTERN AUSTRALIA	146	3.41
UNIVERSITY OF ADELAIDE	143	3.34
GRIFFITH UNIVERSITY	135	3.15
LA TROBE UNIVERSITY	120	2.80
UNIVERSITY OF AUCKLAND	119	2.78
BOND UNIVERSITY	107	2.50
UNIVERSITY OF WOLLONGONG	106	2.48
WESTERN SYDNEY UNIVERSITY	103	2.41
JAMES COOK UNIVERSITY	100	2.34
UNIVERSITY OF OTAGO	88	2.06
UNIVERSITY OF TASMANIA	84	1.96

Our study also sheds light on the leading journals for PHC research publications in the APR. As shown in Table 6, the Australian Family Physician published the highest number of papers with 1,231 (28.74% of the regional total), followed by the Australian Journal of Primary Health with 915 (21.36%). These two journals, the official journal of the Royal Australian College of General Practitioners, have become important venues for the dissemination of primary care research in the region. Other notable

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journals included BMC Family Practice with 407 papers (9.50%) and the long-established Family Practice with 350 papers (8.17%). The prominence of these journals is likely to be due to their specific focus on PHC issues and their wide readership of researchers and practitioners in the field, making them attractive outlets for the publication of high-profile work related to family medicine and general practice. The data highlight the key role of these respected publications in facilitating the exchange of primary care research within the Asia-Pacific academic community.

Table 6. Top twenty journals published papers in the Web of Science Primary Health Care Category in Asian Pacific Region from 2011 to 2023.

Journal name	Paper published	%
AUSTRALIAN FAMILY PHYSICIAN	1231	28.74
AUSTRALIAN JOURNAL OF PRIMARY HEALTH	915	21.36
BMC FAMILY PRACTICE	407	9.50
FAMILY PRACTICE	350	8.17
BRITISH JOURNAL OF GENERAL PRACTICE	304	7.10
PRIMARY CARE DIABETES	210	4.90
BMC PRIMARY CARE	138	3.22
NPJ PRIMARY CARE RESPIRATORY MEDICINE	136	3.18
PRIMARY HEALTH CARE RESEARCH AND DEVELOPMENT	118	2.76
ANNALS OF FAMILY MEDICINE	86	2.01
PHYSICIAN AND SPORTSMEDICINE	85	1.99
CANADIAN FAMILY PHYSICIAN	59	1.38
JOURNAL OF THE AMERICAN BOARD OF FAMILY MEDICINE	47	1.10
PRIMARY CARE RESPIRATORY JOURNAL	41	0.96
AMERICAN FAMILY PHYSICIAN	34	0.79
JOURNAL OF FAMILY PRACTICE	34	0.79
EUROPEAN JOURNAL OF GENERAL PRACTICE	25	0.58
FAMILY MEDICINE	22	0.51
SCANDINAVIAN JOURNAL OF PRIMARY HEALTH CARE	22	0.51
ATENCION PRIMARIA	13	0.30

Table 7 also provides valuable insights into the scientific impact of the PHC research published in the APR. This impact is assessed using citation metrics, which reflect how often a paper is referenced by other scientific work, and journal impact factors, which measure the number of citations of papers published in a given journal within two years. Notably, publications by New Zealand researchers had the highest average number of citations per paper at 13.76. In addition, the average impact factor of papers published by New Zealand authors was the highest in the region at 3.23±1.80.

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Table 7. The scientific impact of papers published in the Web of Science Primary Health Care Category in the Asian Pacific Region between 2011 and 2023 (only countries with more than 20 papers included).

Countries/Regions	Papers number	Total citations	Average citation/paper	H-index	Mean impact factor
Australia	3049	29835	9.79	57	2.28±1.53[*]
China	428	4778	11.16	36	2.86±1.21[†]
New Zealand	257	3537	13.76	28	3.23±1.80[§]
Japan	193	1349	6.99	18	2.92±1.26[‡]
Singapore	150	1611	10.74	20	3.01±1.14[#]
Malaysia	135	1210	8.96	20	2.83±1.17[&]
Taiwan	92	927	10.08	17	2.86±1.14[$]
South Korea	77	867	11.26	15	2.80±1.00
Indonesia	28	215	7.68	8	2.48±1.00

Note: [*]vs[†], [*]vs[§], [*]vs[‡], [*]vs[#]: $p<0.01$, [*]vs[&]: $p=0.028$, [*]vs[$]: $p=0.027$, and [†]vs[§]: $p=0.012$.

4. Discussion

Our study highlights the growing importance and research efforts in PHC in the APR. The region's commitment to advancing knowledge and exploring new horizons in the PHC field is demonstrated by the steady growth in both publication output and citations received from 2011 to 2023. It is worth noting that the WoS database provides a comprehensive and inclusive review of PHC publications in the Asia-Pacific region by including contributions from all authors, regardless of position or affiliation within a study article. This method provided a more accurate representation of research output in this area than previous analyses based solely on the affiliations of first or corresponding authors [14,15].

Overall, Australia has emerged as the powerhouse of PHC research in the APR, leading in terms of output, talent pool and journals [16]. Scholars such as Mieke Van Driel, Helena Britt and Parker Magin from Australia have published extensively in the APR in this research area and have had a significant impact. Their research groups are likely to shape the direction of PHC research. Leading Australian universities such as the University of Sydney, the University of Melbourne and Monash University dominated the production of primary care publications in the region, highlighting Australia's dominance in this area. The Australian Family Physician and the Australian Journal of Primary Health were the two primary publications that published about half of all primary care research in the APR. The fact that both publications are editorially based in Australia demonstrates the importance of geographical affinity.

Papers published from New Zealand, South Korea and China received the most citations on average, indicating a stronger international impact of their research. New Zealand also had the highest average Journal Impact Factor, indicating that its publications are the most cited by academic researchers. In contrast, while Australia has the highest H-index of 57, indicating that it has the largest number of highly cited publications in PHC research within the APR, its mean journal impact factor of 2.28±1.53 was relatively low compared to other leading countries. This suggests that despite Australia's prolific research output, the average citation impact of its publications was not exceptionally high. This may be due to the fact that the two most prolific journals in which APR PHC papers are submitted have a relatively lower impact factor in 2022 JCR. Australian Family Physician, the official journal of the Royal Australian College of General Practice, changed its name to Australian Journal of General Practice in January 2018. The impact factor of the Australian Journal of General Practice in the 2022 JCR was only 2.2 and it was listed in the JCR category Medicine, General & Internal (ranked 107/170). The Australian Journal of Primary Health also has a relatively low impact factor of 1.3 and is ranked 17/19 in the JCR PHC category. More importantly, this finding suggests that there is an opportunity for Australian PHC researchers to further improve the quality and visibility of their research. Thus, while Australia's substantial publication output demonstrates its robust PHC research capacity, the lower average impact factor suggests potential for improvement

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in optimizing the dissemination and impact of this research through more strategic publishing efforts.

According to our results, Taiwan published 92 papers in the PHC category from 2211 to 2023. These publications had an average of 10.08 citations per paper and an average journal impact factor of 2.86±1.14, which were respectable but not leading figures in the APR. This suggests that although Taiwanese researchers are contributing to the field, there is room to improve the visibility, quality and global impact of their PHC research. However, annual publications in family medicine in Taiwan have already reached 222 papers in 2012. Taiwan has a relatively low number of papers published in the PHC category and a relatively high number of publications in other category journals [17]. Family medicine in Taiwan is dedicated to the advancement of the specialty through continuous teaching, research, and advocacy initiatives [18,19]. Fostering collaborations with other medical specialties, as well as gaining support from healthcare institutions and legislators, is critical for the long-term expansion and recognition of family medicine as an essential component of Taiwan's healthcare system [7,20]. Most importantly, Taiwanese family medicine researchers should submit their research to PHC category journals.

Academic publications are critical to the successful development of any medical specialty or study. However, family medicine in the APR faces barriers that may impede its growth compared with other medical specialties [21]. The primary care environment in which many family physicians work presents logistical and budgetary barriers to academic studies. Primary care clinics often have limited resources for research and teaching activities because their primary focus is on providing direct patient care. As a result, faculty members in family medicine may find it difficult to obtain the necessary support and funding for academic research projects. Collaboration across medical disciplines and strong institutional and governmental support are essential to address these issues. As the representative organization for family medicine specialties in the region of Asia-Pacific, the Asia-Pacific Regional WONCA (World Organization of Family Doctors) should take a more aggressive approach in merging academic and research endeavors pertaining to family medicine. By establishing committees or working groups, it can systematically assist the research and development of PHC in this region.

In summary, the overall growth in PHC publication output in the APR appears to be gradual and consistent, reflecting a sustained research interest and commitment to advancing PHC knowledge within the APR.

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