

# The element of family medicine in the mega journal of the family medicine specialty

## A bibliometric analysis of the journal, *Chinese General Practice*

Tzu-Ling Weng, MD<sup>a</sup>,<sup>ID</sup>, Feng-Yuan Chu, MD<sup>b,c</sup>, Bo-Ren Cheng, MD<sup>a,c</sup>, Tzeng-Ji Chen, DrMed<sup>a,b,\*</sup><sup>ID</sup>

### Abstract

**Background:** With the evolving specialization of modern medicine, family medicine (FM), also known as general practice, is relatively late in being recognized as a formal specialty in most countries of the world. Because many non-FM specialists were recruited into the new specialty in the early stages of FM specialization, the contents of FM specialty journals might, to an extent, reflect the development of the FM specialization.

**Methods:** In this study, the voluminous journal, *Chinese General Practice*, which is regarded as the most representative specialty journal, was chosen and analyzed to illustrate the current situation of FM in China. A total of 878 articles, relating to the journal, *Chinese General Practice* in 2018, were retrieved from the publisher's web site and the original articles were categorized into FM- and non-FM- related articles by 3 board-certified FM doctors. Furthermore, the first authors, as well as the institutions and regions where the first authors worked, and their related specialties, were also analyzed.

**Results:** Of the 634 original articles, 252 (39.7%) articles were FM related. Only 41 FM-related articles were written by authors working at FM departments: 3 at community health service centers, 29 at hospitals, and 9 at universities. Of the 382 non-FM related articles, 159 articles dealt with the topic of internal medicine, followed by traditional Chinese medicine (36), obstetrics and gynecology (28), neurology (27), pediatrics (27), and surgery (21).

**Conclusion:** In conclusion, FM publications in China in the study year, as exemplified by *Chinese General Practice*, were mostly contributed by non-FM authors dealing with non-FM topics. A transition to more FM-oriented development might be anticipated in the near future.

**Abbreviation:** FM = family medicine.

**Keywords:** bibliometrics, China, family medicine, general practice, periodicals as topic, specialization

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<sup>a</sup> Department of Family Medicine, Taipei Veterans General Hospital, Taipei,

<sup>b</sup> Department of Family Medicine, Taipei Veterans General Hospital, Yuanshan & Su-Ao Branch, Yilan, <sup>c</sup> School of Medicine, National Yang-Ming University, Taipei, Taiwan.

\* Correspondence: Tzeng-Ji Chen, Department of Family Medicine, Taipei Veterans General Hospital, No. 201, Sector 2, Shipai Road, Beitou District, Taipei 11217, Taiwan (e-mail: tjchen@vghtpe.gov.tw).

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## 1. Introduction

Family medicine (FM), also known as general practice, is one of the oldest modes of practicing medicine throughout the world. However, with the evolving specialization of modern medicine, FM is relatively young in terms of a formal medical specialty: acknowledged in 1952 in the United Kingdom,<sup>[1]</sup> in 1969 in the United States of America,<sup>[2]</sup> and in 1976 in the Federal Republic of Germany.<sup>[3]</sup> FM specialization was acknowledged even later in other parts of the world, for example, in 1983 in India<sup>[4]</sup> and in 2015 in Japan.<sup>[5]</sup>

The development of the modern FM specialty did not merely start from the training of newly graduated physicians. Especially in the early stages, many practicing non-FM specialists were recruited into the new specialty.<sup>[6,7]</sup> The diverse composition of FM specialists might be somewhat reflected in the contents of FM specialty journals.<sup>[8]</sup> In other words, the contents of FM research journals might change with the evolution of the FM specialization. However, before formulating any sort of specialization development indicator on the basis of journal contents, a cross-sectional, descriptive analysis would be required.

In this current study, we aimed to exemplify the situation by using a large specialty journal of FM. The journal, *Chinese General Practice*, established in 1998 in China, has been flourishing with numerous publications: currently 36 issues per year and around 24 articles per issue. The People's Republic of China is the most populous country with the world's largest emerging economy. Since the 1990s, the government has been

rapidly developing FM, commonly referred to as general medicine, and has actively attracted physicians through diverse and speedy pathways.<sup>16,91</sup> The number of registered general practitioners has increased from around 10,000 in 2008, to 308,740 in 2018.<sup>110,111</sup> *Chinese General Practice*, as the first and largest representative journal of the FM specialty in China, can serve as a window into the development stage of FM in China.<sup>112</sup> Since the great majority of FM specialists in China were recruited from other non-FM specialties, we can hypothesize that research articles in the *Chinese General Practice* journal are more likely to be oriented towards non-FM themes than towards FM themes.

## 2. Methods

Full-text articles have been freely available on the website of *Chinese General Practice* (<http://123.57.154.95:8088/zgqkyx/CN/article/showOldVolumn.do>) since 2015 (volume 18). In 2018, all 878 articles of volume 21 were retrieved. Only original research articles using an IMRD (introduction-methods-results-discussion) format were included for analysis. Editorials, case reports, special reports, theoretical papers, and opinions were excluded.

Each eligible article was firstly categorized as a FM- or non-FM-related article. An article was deemed as FM-related if the study could be conducted in a family practice or the results could be directly applied to family practices. On the other side, an article was deemed as a non-FM article if the study could be performed only in settings of non-FM specialties.

For each non-FM-related article, we further categorized it according to the specialty or subspecialty that the article belonged to. The categorization of specialties and subspecialties was based on the classification proposed by the American Board of Medical Specialties,<sup>113</sup> the largest non-profit, physician-led specialty certification organization in the United States. An article could be assigned, at most, to 2 specialties if its content involved multiple specialties. An article dealing with traditional Chinese medicine (TCM) was arbitrarily categorized as relating to the TCM specialty only because TCM was inherently different from Western medicine.

Two board-certified FM physicians in Taiwan, Cheng and Chu, independently categorized FM/non-FM articles and the specialties of non-FM articles. In case of inconsistency, the decision was made by joint discussion among the 2 physicians and a FM professor, Chen.

For each FM article, we also analyzed the affiliated institutions and departments of the first author.<sup>114</sup> We categorized the institutions into 6 groups: community health service center, hospital, disease prevention and control center, university, research center, and others. If an author worked at 2 or more affiliated institutions, only the first one in the list was analyzed. The departments were categorized into FM and non-FM. Departments of general medicine, geriatric medicine, preventive medicine, and comprehensive medicine were operationally categorized as FM departments.

Furthermore, we studied the geographic locations where FM/non-FM articles originated. Only the first affiliated institution of the first author of each article was analyzed. Mainland China has an area of 9,596,961 km<sup>2</sup> and 31 provincial divisions, plus the special administrative regions of Hong Kong and Macau. An open-source template map of China, obtained from the Wikipedia website ([https://zh.wikipedia.org/wiki/File:China\\_blank\\_map.svg](https://zh.wikipedia.org/wiki/File:China_blank_map.svg)), showing the provincial divisions as well as

the number of articles in each area represented by color shading, was used to illustrate the geographic distribution. The darker the color, the more prolific was the area.

We used Microsoft Excel 2019 to record and compute the data. Only descriptive statistics, including frequency and percentages, were presented.

## 3. Results

There were 36 issues of the journal, *Chinese General Practice*, in 2018, and the number of articles published in each issue was approximately the same, namely, between 21 and 27, making 878 articles in total. After other types of articles were excluded (n = 244), 634 original articles were analyzed. Figure 1 shows the flowchart of articles included for analysis in this study.

Figure 2 reveals the distribution of other types of articles, FM original articles, and non-FM original articles, in each issue. There was a high proportion of original articles, accounting for 72.2% of the total 36 issues. The number of FM articles varied among issues, from 2 to 15 per issue. The total number of FM articles was 252, accounting for about 40% (252/634) of the analyzed articles.

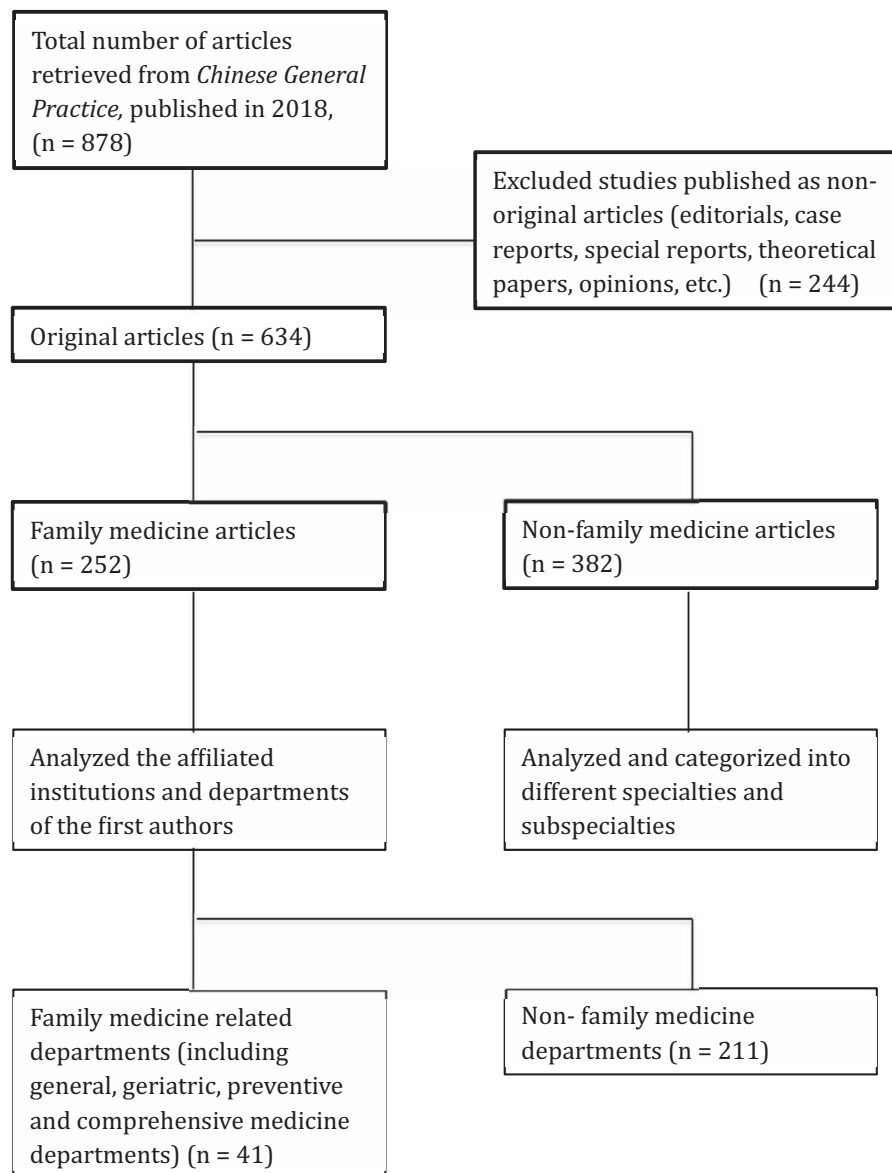
On the other hand, the further classification of those 382 non-FM articles is demonstrated in Table 1. These articles were most frequently counted as internal medicine (41.6%), followed by traditional Chinese medicine (9.4%), obstetrics and gynecology (7.3%), neurology (7.1%), pediatrics (7.1%), and surgery (5.5%). Moreover, in the subspecialty of internal medicine, cardiology was prevalent, followed by metabolism and endocrinology, gastroenterology, oncology, and the respiratory subspecialty. In addition to studies focusing on humans, there were 22 non-human articles that we placed into a special group.

Of the 252 FM articles, 41 articles (16.3%) were written by first authors from FM departments (Table 2). Among these 41 articles, 3 articles were from community health service centers, 29 from hospitals, and 9 from universities. Among the other 211 FM articles written by authors from non-FM departments, 116 were written by authors from universities, followed by authors from hospitals (46), community health service centers (27), research centers (10), and disease control and prevention centers (4).

Figure 3 shows the distribution of areas where the first authors of FM articles worked (Fig. 3a) and the distribution of areas where the first authors of non-FM articles worked (Fig. 3b). Of those first authors of FM articles, almost half of them were from institutions that belonged to the 2 largest municipalities: Beijing City (22%) and Shanghai City (20%). On the other hand, of those first authors of non-FM articles, two-thirds of them were gathered in institutions on the east coast and in southeastern areas of China, while Beijing City and the area nearby accounted for 26% of the institutions where the first authors worked.

## 4. Discussion

In the current study, the aim was to investigate the current development status of FM in China from the viewpoint of academic research. We found that original articles were the main components of the journal, *Chinese General Practice*, in 2018, and 39.7% of the articles were FM related. As hypothesized, more articles were found that were oriented towards non-FM themes. Echoing the previous theory that the contents of FM research journals might change in the future, with the evolution of FM specialization, the relatively low proportion of FM specific



**Figure 1.** Flowchart of the steps used to select our articles.

articles might indicate that FM in China, in 2018, was still at an early developmental stage. According to reports, China only started their FM development in recent decades.<sup>[6]</sup> Although they rapidly built the related laws, training programs, transferring programs, FM departments in universities and graduate schools, FM education and research institutions, and journals, it has still required more time for the academic field of FM to grow, strengthen, and further become more orientated.

The boundary between FM and the other professions might be indistinct in clinical practice and also in the area of research because FM is interdisciplinary by its nature.<sup>[15]</sup> This could be one of the reasons for the low proportion of FM articles in a FM specialty journal. Furthermore, due to the vast territory and massive population of China, there is a great demand for general physicians. The Chinese government plans to have 2 to 3 qualified general practitioners for every 10,000 residents by

2020, and even 5 qualified general practitioners for every 10,000 residents by 2030.<sup>[16]</sup> To achieve an adequate workforce, multiple pathways have been established to train general physicians.<sup>[17,18]</sup> One of the fastest ways was to transfer a specialist of another field into a general physician role via a short training course lasting for 12 months.<sup>[11,19]</sup> It is possible that general physicians, who previously worked in other specialties, may be clinically practicing FM, while at the same time conducting research related to their previous specialties. This might be another explanation for the low proportion of FM-related articles in this journal.

After analyzing the non-FM articles, the number of articles classified as internal medicine was the greatest, which was not surprising. There were many differences between the internal medicine articles and the FM articles, including the demographics of the patients they treated, whether or not to focus on

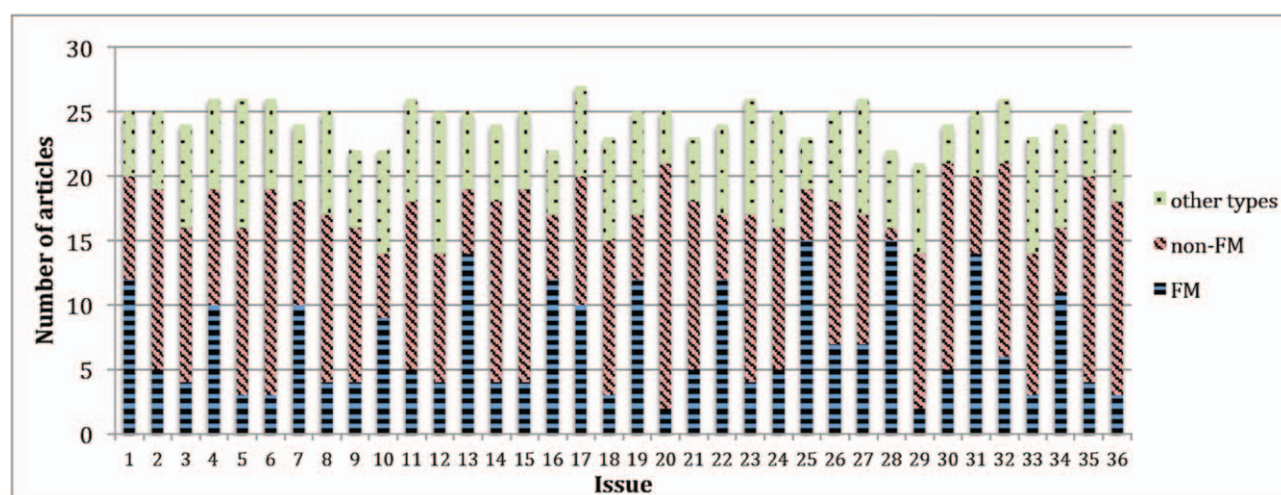


Figure 2. Number of articles in each issue of the journal, *Chinese General Practice*, in 2018. \*FM = family medicine.

Table 1

The distribution of specialties in non-family medicine – original articles in *Chinese General Practice*, 2018.

Specialties	Subspecialties	*Count of articles (n=382)	†Percentage (%)
Internal Medicine		159	41.6
	Cardiology	36	
	Metabolism & Endocrinology	23	
	Gastroenterology	22	
	Oncology	21	
	Respiratory	18	
	Nephrology	14	
	Infectious Disease	14	
	Allergy/Immunology/Rheumatology	6	
	Hematology	5	
Traditional Chinese Medicine		36	9.4
Obstetrics and Gynecology		28	7.3
	Obstetrics	23	
	Gynecology	5	
Neurology		27	7.1
Pediatrics		27	7.1
Surgery		21	5.5
	General Surgery	8	
	Colon and Rectal Surgery	6	
	Thoracic Surgery	5	
	Cardiovascular surgery	2	
Psychiatry		20	5.2
Orthopedic Surgery		17	4.5
Radiology		15	3.9
Neurological Surgery		10	2.6
Rehabilitation Medicine		5	1.3
Urology		3	0.0
Otolaryngology – Head and Neck Surgery		2	0.0
Dentistry		2	0.0
Emergency Medicine		2	0.0
Radiation Oncology		1	0.0
Nuclear Medicine		1	0.0
Anesthesiology		1	0.0
Non-human articles		22	5.8
Others		24	6.3

\* The number of articles was 382, and the count was 423 because some articles were counted in more than one specialty.

† The total percentage was larger than 100% because the number of articles was the denominator and the count was the numerator.

The table was ordered by numbers of articles in each group.

The light words represent subspecialties, belonging to the specialty shown above in bold letters.

**Table 2****Number of family medicine articles in each category, sorted by first author institution and whether they are from family medicine departments.**

The first institution of first author (%)	FM department	Non-FM department	Total
Community health service center	3 (1.2)	27 (10.7)	30 (11.9)
Hospital	29 (11.5)	46 (18.3)	75 (29.8)
Disease prevention and control center	0 (0)	4 (1.6)	4 (1.6)
University	9 (3.6)	116 (46)	125 (49.6)
Research center	0 (0)	10 (3.9)	10 (3.9)
Others	0 (0)	8 (3.2)	8 (3.2)
Total	41 (16.3)	211 (83.7)	252 (100)

\*FM = family medicine.

preventative medicine, having to deal with a multifaceted field of expertise, the training courses, and the careers which the physicians chose. However, there were still some similarities, such as the diseases they targeted and the way they treated them. Many internal medicine articles, in the journal, reflected the characteristics above and implied that there were numerous general physicians in China that may have chosen to transfer from internal medicine. Indeed, a report in 2020 showed that almost half of the heads of the general practice departments in 41 hospitals (mostly grade 3) in China were transferred from internal medicine.<sup>[20]</sup>

We also found 36 (9.4%) articles related to traditional Chinese medicine (TCM). This is a field with a long history in China, or even in Asia, going back thousands of years. It is also an important part of Chinese culture. In recent years, the world was surprised by the discovery of a Chinese herb that could treat malaria,<sup>[21,22]</sup> and acupuncture is now prevalent in the western world.<sup>[23]</sup> More and more TCM research papers are appearing in international journals. In contrast, a systemic review article stated that there were few western clinical practice guidelines in China recommending TCM, especially Chinese herb medicine, as a part of their clinical practice.<sup>[24]</sup> Nevertheless, despite the controversy between TCM and western medicine, TCM still has an indispensable and important position in Chinese clinical practice.<sup>[25]</sup>

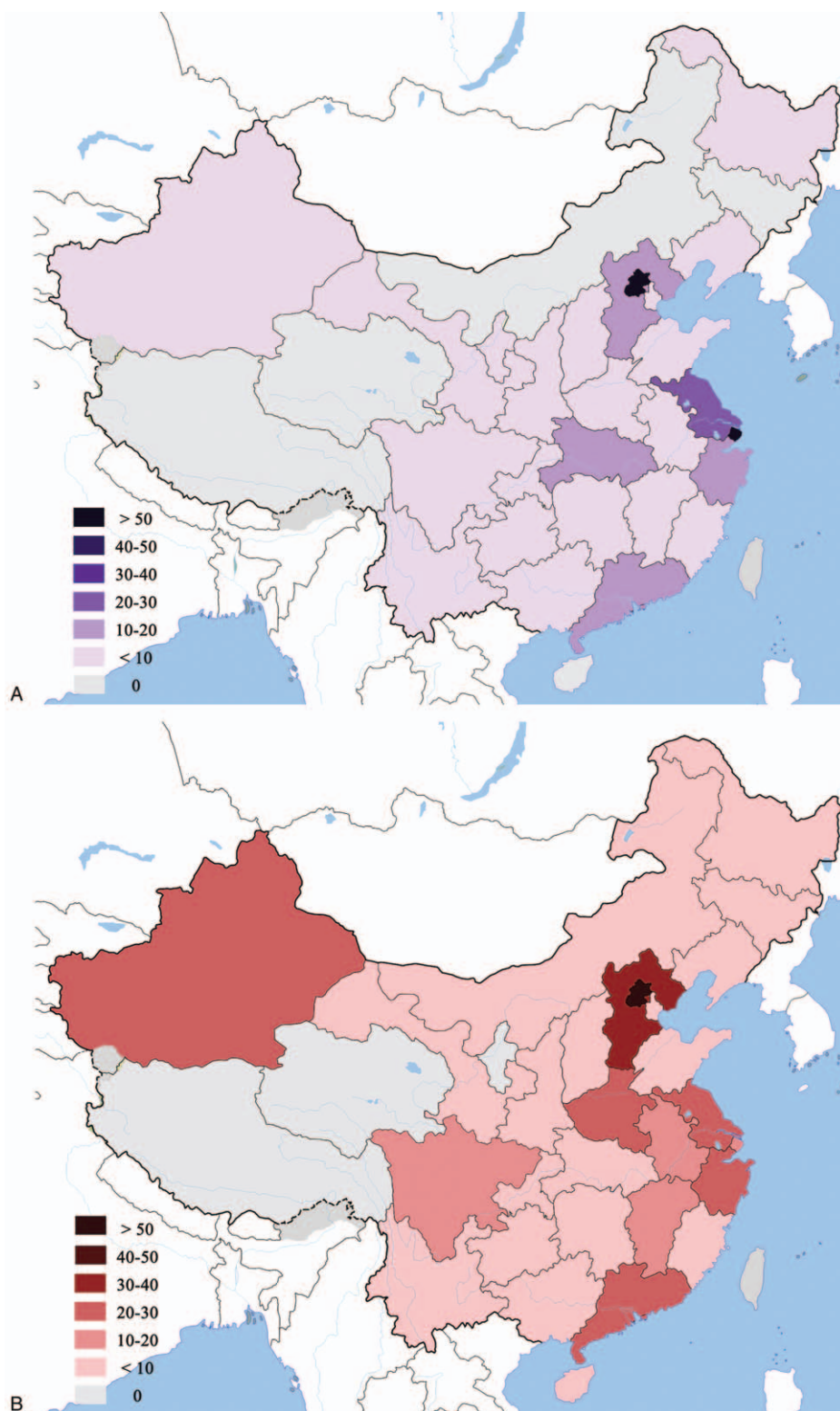
In terms of FM articles, we found most of them were written by authors from academic systems. We also noticed that less than 20% of the FM articles were written by FM authors and only about 3% were written by community general physicians. Those articles written by authors from non-FM departments were from university departments, such as health, public health, nursing, management, medical management, and physical education, and from hospital departments such as nutrition, internal medicine, pediatrics, emergency departments, and management. FM overlapped with these fields to some degree because of its interdisciplinary nature. Although non-FM researchers have contributed much to FM research, we still expected FM researchers to dominate in the FM academic field, especially general physicians who had engaged in clinical practice, and community physicians, in particular. The reason for the low number of publications from general physicians might be due to the short time they have been practicing in general practice, their busy and multifaceted clinical work, or even a lack of familiarity of this relatively new specialty. Further research is needed to confirm these explanations.

The distribution of authors of FM and non-FM articles shows the geographical imbalance. The urban-rural disparities occur worldwide,<sup>[26,27]</sup> and China is no exception, as shown in many

previous studies.<sup>[28]</sup> As for China's report in 2018 and 2019, if considering per capita disposable income, Shanghai City, Beijing City and nearly all of the east coast were the richest areas in China.<sup>[29]</sup> As we had predicted, we could generally regard the distribution of authors of non-FM articles as pertaining to medical services and research resources, which were mainly distributed in the provinces along the east coast. The distribution of authors of FM articles showed a very significant regional gap. In addition to the imbalance of medical services and research resources, this finding might also reflect the different acceptance and understanding of this new specialty, the level of effort the government has invested, and whether there is sufficient manpower to promote it. A report in 2013 showed that the ratio of family doctors per 10,000 people had huge regional differences, and that eastern China had 2 times more than central and western China.<sup>[30]</sup> Other studies have also shown that poorer areas have a stronger demand for family doctors due to their lack of high-class hospitals and medical services; however, the newly trained family doctors tended to work in urban or richer areas.<sup>[16,31]</sup> This imbalance of FM physicians for medical services can potentially become larger with time if this problem is left unresolved.

There were some limitations in this study. First, we targeted only a single FM journal in China because other Chinese journals related to FM in China were not widely published and did not have free online access to the full text as this journal does. And second, we did this study only for a single year, so the results cannot fully show the development of the academic field of FM in China from the past to the present. The reason was that the full text of the Chinese General Practice has only been freely available online since 2015. Because it was more difficult to observe significant changes in 3 years, we decided to start with a single-year (2018) cross-sectional study. Third, the classification of the articles into FM or non-FM groups had some indistinct zones. Although we tried to set up an objective principle for categorization, it was still based on our country's experience and perspective. Hence, our study may not fully represent the real situation in China. Forth, the classification for non-FM articles into different specialties also had mild uncertainty due to the overlapping fields of different specialties, such as hypospadias falling under both urology and pediatrics. Lastly, due to some incomplete data, such as the authors' affiliation being unspecified by the articles, the percentage of FM related departments might have been underestimated.

In conclusion, literatures pointed out that in addition to their system and hardware, FM in China has also improved in research year by year since a decade ago.<sup>[32,33]</sup> This is also reflected in the rapid progress of the largest FM research journal in China,



**Figure 3.** The geographic distribution of the primary institutions of the first authors of (3a) family medicine articles and (3b) non-family medicine articles. The scale represents the number of articles.

*Chinese General Practice*, studied in this paper, from 350 published articles in year 2000 to 878 published articles in year 2018. In our study, we found that the *Chinese General Practice* had research articles more orientated to non-FM themes, and that

FM related articles were contributed in greater numbers by authors from non-FM departments on average in 2018. This indicated that FM development in China might be still at a relatively early stage with recruitment of many specialists from

other disciplines. Moreover, the gap in medical services and research resources between the richer and poorer areas was still significant. Nevertheless, according to the current speed and determination to promote FM in China, a more FM-oriented transition in research and a diminishing regional imbalance might be anticipated in the near future.

### Author contributions

**Conceptualization:** Tzeng-Ji Chen.

**Data curation:** Tzeng-Ji Chen.

**Formal analysis:** Tzu-Ling Weng, Feng-Yuan Chu, Bo-Ren Cheng, Tzeng-Ji Chen.

**Funding acquisition:** Tzeng-Ji Chen.

**Methodology:** Tzu-Ling Weng, Tzeng-Ji Chen.

**Supervision:** Tzeng-Ji Chen.

**Writing – original draft:** Tzu-Ling Weng.

**Writing – review & editing:** Feng-Yuan Chu, Tzeng-Ji Chen.

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