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Article

Family medicine academic workforce of medical schools in Taiwan: A nationwide survey

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Abstract: Little is known about family medicine academic staff in Taiwan, and basic data about this workforce may aid healthcare decision makers. We analysed data on Taiwan's 13 medical schools collected by the Taiwan Association of Family Medicine from June to September 2019. Items included medical school names and total staff, and the gender, age, degree, working title (part-time/full-time), academic level, and sub-specialty of each current family medicine faculty member. A total of 116 family medicine faculty members were reported; most were male (n= 85, 73.3%). Ages ranged between 30 and 69 years, with a mean (SD) age of 43.3 (8.09). Faculty members with a master's degree were the largest group (n= 49, 42.2%), and most were academic lecturers (n=49, 42.2%). Additionally, only about one-fourth (n=26, 22.4%) of family medicine faculty in medical schools were full-time, while the other three-fourths (n=90, 77.6%) were part-time faculty; most were located in northern Taiwan (n=79, 68.1%) and specialized in gerontology and geriatrics (n=55, 47.4%) and hospice palliative care (n=53, 45.7%). Our research provides the most complete census of family medicine academic physicians in medical schools in Taiwan. The results inform efforts to improve the establishment and development of family medicine departments in Taiwan.

Keywords: Healthcare; Family Medicine, Medicine, Public Administration & Public Policy

1. Introduction

The family medicine workforce plays an increasingly important role as health care providers, leaders, managers, supervisors, and overall coordinators of personal and community health care, especially since the beginning of the COVID-19 pandemic [1]. Since 2008, the World Health Organization has listed family medicine as the discipline most closely related to this type of health care and renewed the call for the development of high-quality primary care worldwide [2]. As early as the 19th century, the trend emerged in the United States and Europe of having general practitioners provide professional services to individuals, families, and communities. The first term for family medicine doctors originated in the French Industrial Revolution. The word "médicode cabecera" [3] means that a doctor can stand on the patient's head to provide care for him, on the patient's bed. The family medicine profession began in the 1960s and spread to various countries in the 1970s [4].

However, in the first half of the 20th century, general medicine began to decline, replaced by medical specialization. Medical schools began to lose interest in general medicine, and the lack of postgraduate training in general medicine led to its decreased intellectual challenge. Subsequently, the international medical community realized that newly graduated doctors were unprepared to address the full range of people's health problems. As a result, general medical colleges and colleges specializing in the academic development of family medicine have been established in many countries. In the following years, medical schools opened family medicine departments and developed a training plan for

family medicine faculty. The movement towards establishing family medicine departments in medical schools originated in the United Kingdom in 1953, and the American Medical Association (AMA) in 1990 adopted the principle that all medical schools in the United States must have a family medicine department.

In Europe, this principle has gradually been extended to all countries. Currently, all medical schools in the following countries have departments of family medicine: Belgium, Croatia, Denmark, Finland, Germany, Ireland, Malta, Netherlands, Norway, Poland, Portugal, Slovenia, Sweden, and the United Kingdom. However, some countries may lack family medicine departments in medical schools. For example, in Austria, France, Greece, and Hungary, 20%–75% of medical schools have a family medicine department, while in Italy and Spain, the rate is 0%. Research indicates that many Asian and Pacific countries/regions also provide training in family medicine, including Australia, Hong Kong, Malaysia, the Philippines, Singapore, South Korea, Taiwan, and New Zealand, as well as China, Egypt, India, Israel, and Japan. Nigeria, Russia, South Africa, Ukraine, and Vietnam also provide training in family medicine. The essence of family medicine is that it is a specialty field of medicine that focuses on primary care. Family medicine providers can help countries worldwide maintain and improve their health and well-being by developing more productive, coordinated, and cost-effective health care methods and optimizing the primary health care system [5]. Although prior research has focused on Taiwan's family medicine training programs, the current status of family medicine faculty in Taiwan's medical schools is unknown. Therefore, this study aims to evaluate the human resource status of family medicine faculty in medical schools in Taiwan.

2. Materials and Methods

2.1. Database of major medical schools in Taiwan

We used Taiwan's Ministry of Education's public information platform database for colleges and universities to collect data from all Taiwan's medical schools and conduct category queries by field. The fields of medical and health and social welfare are divided into two categories: (1) medical health and social welfare and (2) medical. After searching the Department of Hygiene, a total of eight academic categories were identified (namely, dentistry, medical science, nursing and midwifery, medical technology and laboratory science, treatment and rehabilitation, pharmacy, and traditional medicine). A search was then conducted on the medical category for complementary medical treatment and other medical and health sciences, and a total of 16 public and private universities were identified. Of these 16 universities, 13 general universities (four public and nine private) have medical schools in Taiwan. The four public medical schools are National Taiwan University, National Yang-Ming University (in 2020, it merged with National Chiao Tung University and changed its name to National Yang Ming Chiao Tung University), National Defense Medical Center, and National Cheng Kung University. The nine private medical schools are Taipei Medical University, Mackay Medical College, Fu Jen Catholic University, Chang Gung University, China Medical University, Chung-Shan Medical University, Kaohsiung Medical University, I-Shou University, and Tzu Chi University [6].

2.2. Data on the distribution of family medicine academic faculty in Taiwan medical schools

Our survey analyzed data from June to September 2019 on all 13 medical schools in Taiwan, and the data was collected by the Taiwan Association of Family Medicine. The data included items used in previous studies that clarify the demographics and practice characteristics of the family medicine faculty, including the number of current faculty by gender, birth year, degree, commitment (part-time/full-time), academic rank, and subspecialty. Data were analyzed using Excel 2019 and R.

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2.3. Definitions of medical specialties and sub-specialties in Taiwan

In the Diplomate Specialization and Examination Regulations issued by the Ministry of Health and Welfare in 2018, family medicine is included in 23 physician specializations [7]. However, for the subspecialties of geriatrics, hospice and palliative medicine, environmental and occupational medicine, obesity medicine, international travel medicine, adolescent medicine, and osteoporosis medicine, family medicine is not a specialization of the Ministry of Health and Welfare certificate [8].

2.4. Defintion of Taiwan geographical distribution

The Taiwan area includes the northern, central, southern, and eastern regions. The northern region includes Taipei, New Taipei, Keelung, Hsinchu, and Taoyuan cities, and Hsinchu and Yilan counties. The central region includes Taichung city and Miaoli, Changhua, Nantou, and Yunlin counties. The southern region includes Kaohsiung, Tainan, and Chiayi cities, and Chiayi, Pingtung, and Penghu counties. The eastern region includes Hualien and Taitung counties [6].

3. Results

According to the analysis, the results indicate that not all medical schools have a family medicine department. Among the 13 medical schools in Taiwan, nine (69.2%) (National Taiwan University, National Yang-Ming University, Taipei Medical University, National Defense Medical Center, China Medical University, Chung Shan Medical University, National Cheng Kung University, Kaohsiung Medical University, and Tzu Chi University, listed from north to south and west to east) have a family medicine department. The remaining four (30.8%) (Mackay Medical College, Fu Jen Catholic University, Chang Gung University, I-Shou University) have a family medicine department in the affiliated hospital but not in the medical school (Table 1).

Table 1. Characteristics of medical schools in Taiwan (n = 13)

	Medical school type			
	Public		Private	
	n	%	n	%
With family medicine department				
North	3	23.1	1	7.7
Central	0	0	2	15.3
South	1	7.7	1	7.7
East	0	0	1	7.7
Total	4	30.8	5	38.4
Without family medicine department				
North	0	0	3	23.1
Central	0	0	0	0
South	0	0	1	7.7
East	0	0	0	0
Total	0	0	4	30.8

A total of 116 family medicine physicians hold faculty positions. Table 2 summarizes the current distribution of medical faculty in medical schools. The nine medical schools with family medicine departments have a total of 99 medical faculty members. On average, there are 11.00 medical faculty members in the family medicine department of each medical school. In the four medical schools without a family medicine

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department, there are a total of 17 medical teaching positions, and each school has an average of 4.25 medical faculty positions. Public medical schools have more medical faculty members than private medical schools (54.3% vs. 45.7%, respectively), but the difference is not significant. However, the difference is statistically significant between the north vs. the central, south, and east regions (68.1%, 12.1%, 11.2%, and 8.6%, respectively).

Table 2. Distribution of family medicine academic physicians of medical schools in Taiwan (n=13).

	Total family medicine academic physician in Taiwan (n=116)			
	Public (n=63, 54.3%)		Private (n=53, 45.7%)	
	n	%	n	%
With a family medicine department (n=99, 85.3%)	63	100	36	67.9
Without a family medicine department (n=17, 14.7%)	0	0	17	32.1
North (n=79, 68.1%)	58	92	21	39.6
Central (n=14, 12.1%)	0	0	14	26.4
South (n=13, 11.2%)	5	8	8	15.1
East (n=10, 8.6%)	0	0	10	18.9

The characteristics of all 116 faculty in the Department of Family Medicine are shown in Table 3. There are 2.7 times as many males (n= 85, 73.3%) as females (n= 31, 26.7%). The age ranges from 30 to 69 years, and the most frequent age category is 40–49 years old (34.5%), followed by 50–59 years old (33.6%), 30–39 years old (19%), and 60-69 years old (12.9%) categories. Lecturers account for the majority (42.2%) of faculty, followed by assistant professors (31%), associate professors (16.4%), and professors (10.3%). There were only two family medicine faculty with more than 20 years of teaching experience; 17.2% had 10–20 years of teaching experience and the majority (81.1%) had less than 10 years of teaching experience. The most commonly held degree among family medicine faculty is a master's degree (n = 49, 42.2%), followed by a doctorate (n = 38, 33%), and finally a bachelor's degree (n = 29, 25%). Most medical faculty are not full-time; only 20.7% of all family medicine faculty are full-time in medical schools (n=24), and the other 79.3% are part-time (n=92, three physicians are full-time in clinics, and 89 physicians are full-time in medical centres, regional hospitals, or regional hospitals). All medical faculty are family medicine specialists; most have sub-specialties (n=93, 80.2%), and a few do not (n=23, 19.8%). Most subspecialties are geriatrics (47.4%), followed by tranquillity and palliative medicine (45.7%), environmental and occupational medicine (11.2%), obesity medicine (9.5%), international travel medicine (4.3%), adolescent medicine (2.6%), and osteoporosis medicine (n=2, 1.7%).

Table 3. Characteristics of family medicine faculty in medical schools in Taiwan (n=116).

		n	%
Gender			
	Male	85	73.3
	Female	31	26.7
Age (y)			
	30–39	22	19.0
	40–49	40	34.5

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	50–59	39	33.6
	60–69	15	12.9
Work status			
	Full-time	26	22.4
	Adjunct	90	77.6
Academic position			
	Professor	12	10.3
	Associate Professor	19	16.4
	Assistant Professor	36	31.0
	Lecturer	49	42.2
Faculty year			
	<10 years	94	81.1%
	10–20 years	20	17.2%
	>20 years	2	1.7%
Faculty degree			
	PhD	38	32.8
	Master	49	42.2
	Bachelor	29	0.25
Subspecialty			
	Gerontology and geriatrics medicine	55	47.4
	Hospice palliative medicine	53	45.7
	Environmental and occupational medicine	13	11.2
	Obesity medicine	11	9.5
	International travel medicine	5	4.3
	Adolescent medicine	3	2.6
	Osteoporosis medicine	2	1.7

The total number of full-time staff members in the Family Medicine Department of Taiwan Medical College is 20 males (77%) and six females (23%). The number of male full-time faculty positions increases with rank. There are more male full-time professors than associate professors, assistant professors, and full-time lecturers (50%, 35%, 15%,

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and 0%, respectively). Conversely, there are no female full-time professors. Half of the females are assistant professors, and the remaining female full-time faculty are associate professors and lecturers. In addition, part-time teaching positions in family medicine are also more frequently held by men than women (n=65 vs. n=25), but contrary to the case for full-time teaching positions, the number of both male and female positions decrease with rank, with lecturers making up the largest proportion of both male and female part-time teaching positions (Table 4).

Table 4. Distribution in academic rank by gender for all full-time family medicine physician faculty members in Taiwan medical schools in 2019

Rank	**All Faculty**		**Male Faculty**		**Female Faculty**	
	n	%	n	%	n	%
Full-time faculty						
Professor	10	38. 5	10	50	0	0
Associate Professor	9	34.6	7	35	2	33.3
Assistant Professor	6	23.1	3	15	3	50
Lecturer	1	3.8	0	0	1	16.7
Total	26	100	20	100	6	100
Adjunct time faculty						
Professor	2	2.2	2	3.0	0	0
Associate Professor	10	11.1	7	10.8	3	12
Assistant Professor	30	33.3	23	35.4	7	28
Lecturer	48	53.4	33	50.8	15	60
Total	90	100	65	100	25	100

With increasing rank, the number of family medicine faculty in Taiwan Medical schools gradually decreases for both males and females. In particular, no women are family medicine professors in medical schools; the largest area in the figure indicates that the proportion of male lecturers is the highest (Figure 1).

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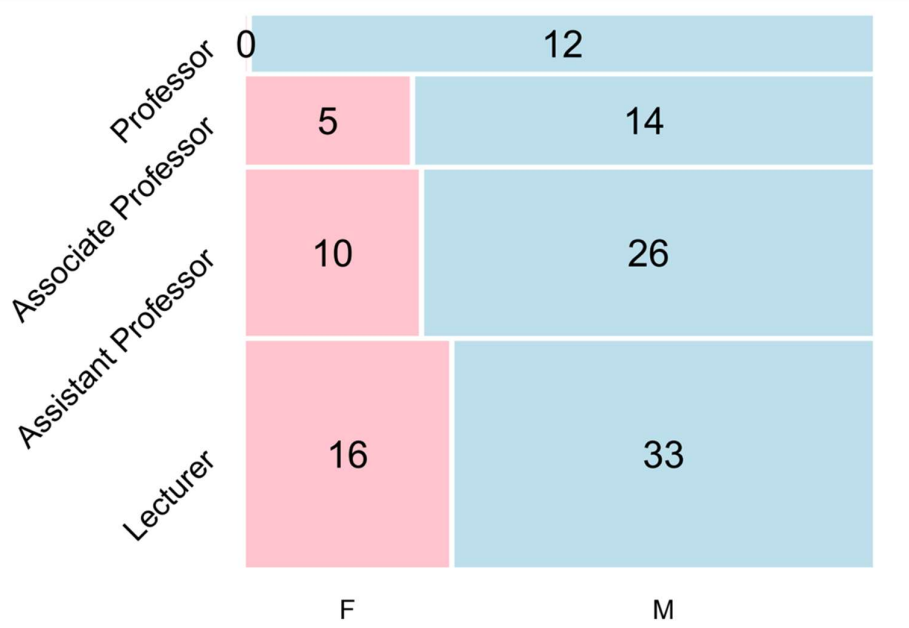

Figure 1. Gender and faculty title of academic family medicine faculty.

Figure 2 displays the average distribution of the male to female ratio and age for each rank level. Most faculty in the Department of Family Medicine are lecturers (n = 49, 42.2%) with an average male age of 43.4, female age of 43.1, and a total age (SD) of 43.3 (8.09). Assistant professors (n = 36, 31.0%) have an average male age of 47.7, female age of 42.6, and a total age (SD) of 46.3 (6.77); associate professors (n = 19, 16.3%) have an average male age of 53.4, female age of 52.4, and a total age (SD) of 53.1 (6.91); and professors (n = 12, 10.3%) have an average male age of 58.1 and a total age (SD) of 58.1 (4.89).

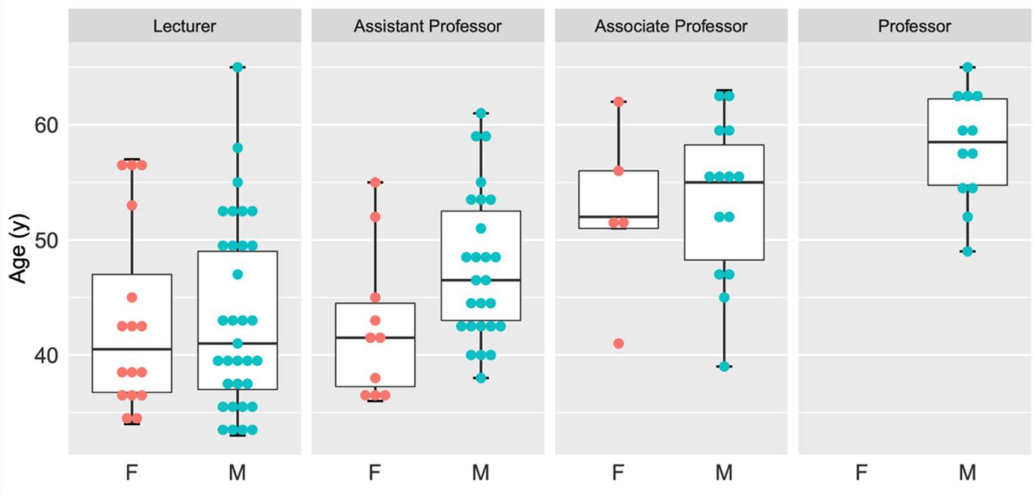

Figure 2. The age and gender distribution of family medicine academic faculty by rank.

4. Discussion

Medical schools both shape and are shaped by healthcare systems. A previous study found that Taiwan had 11 medical schools with a family medicine department in the Asian Pacific in 2014 [9]. However, in our study, we found that all 13 medical schools in Taiwan have an undergraduate education program in family medicine. The current results indicate that Taiwan established two additional medical schools between 2014 and 2019, but

only nine of the medical schools had established family medicine departments. Additional efforts are needed to ensure that private medical schools in Taiwan have a department of family medicine to provide principles and practices of improved family medicine. We found that most medical schools lacking a family medicine department established a family medicine department in a university hospital. It may be that these private medical schools were established after the affiliated hospitals. Medical schools were established while there was no support for basic research and teaching, and the clinical services had limitations. In the early stages of development, strategic alliances were also established with other universities, such as Mackay Medical College, to meet the teaching needs [10].

Research indicates a family medicine department needs manpower and material resources to provide a full range of family medicine education, clinical services, and research plans. Human resources include faculty doctors and other personnel who have sufficient time to teach and fully supervise trainees, develop courses, and conduct research. These faculty members usually include a combination of professionally trained family medicine physicians and enthusiastic specialist physicians. A community-based family doctor may be hired as a full-time teacher, part-time clinical instructor, or mentor [11].

All medical faculty of medical schools are family medicine specialists, and their subspecialties are diverse. Most physicians' sub-specialties are geriatric and palliative medicine regarding to our research. Therefore, the current family medicine education program should include content such as undergraduate family medicine, gerontology, and palliative medicine. Our research also indicates that most medical faculty in Taiwan are not full-time; most are part-time. Also, the number of family medicine faculty in Taiwan medical schools is low, and most of them are clinicians in large hospitals, which is consistent with a previous study [12]. Teachers of undergraduate family medicine should be specialists or at least experienced trainees in education practice or family medicine in the future.

Our study also shows that as the ranks of faculty increase, their age gradually increases, and their seniority is longer. The average age of lecturers is younger, and professors are mostly older than other ranks. This result is related to Taiwan's current system for medical academic promotion and the need for instructors to serve as role models with years of practice and current knowledge [9].

Our research shows that most faculty in the department of family medicine are male (73.3% vs. 26.7%), and these results are similar to those in the United States (62.7% vs. 37.3%) [13]. In Taiwan's medical departments, the proportion of female teachers being promoted to professors is lower than that of their male counterparts and needs to be improved [14]. Although our study did not collect long-term data, it shows that the proportion of female teachers in family medicine who were promoted to professors was zero in 2019, and the teaching environment did not improve considerably compared to that in previous studies. The number of full-time male faculty in the family medicine department of Taiwan Medical College increases with rank, while the number of part-time male faculty decreases with rank. This finding suggests that the full-time and part-time status of male family medicine teachers depends on rank: greater emphasis on a full-time status results in a higher rank, whereas a greater emphasis on a part-time status results in a lower rank.

In other countries, regardless of gender, the number of people gradually decreases with rank. This finding may be related to a rigorous promotion system, which makes promotion difficult. In addition, the number of medical faculty members in foreign medical schools, whether male or female, is higher for full-time than part-time faculty [10]. Conversely, in Taiwan, the total number of part-time medical faculty exceeds that of full-time medical faculty. It may be that the promotion system of medical schools differs between Taiwan and other countries. It may also be that the current family medicine education in Taiwanese medical schools has been given little attention, so most faculty remain part-time instructors.

Among females, the number of full-time faculty is significantly less than that of part-time faculty, but the number of part-time faculty is still lower than that of male faculty.

Female part-time medical faculty members were the most likely to be instructors. This finding may be related to the promotion system of various medical schools in Taiwan. Moreover, there has not been a systematic review of family medicine teaching positions related to gender differences. In addition, female teaching positions in Taiwan may be affected by Asian social traditions, such as the impact of childbirth and raising children and family care on their careers, especially when facing academic career promotion issues. [15] [16].

Female teachers, in particular, believe that the lack of support and recognition of the role of part-time instructors will undermine their abilities due to associated 'dejected' and 'unvalued' attitudes [17]. Compared with men with children, women with children spend more time on childcare issues, encounter more difficulties at work, and work more on weekends. Women believe that the lack of support and recognition from part-time teachers weakens their ability to balance family needs and careers [13]. Our research results substantiated the current status of women's family medicine teaching positions and the bottlenecks encountered in academic advancement. However, further investigations are needed to understand gender differences in medical teaching positions in medical schools in Taiwan.

A previous study shows that the shortage of primary care physicians in the United States is due to population growth and aging, physician retirement, and changing physician work patterns [18]. Similarly, our study shows that Taiwan faces the same problems concerning an aging population, physician retirement in family medicine, and a changing environment in the health care system. Thus, Taiwan can learn from the U.S. and how it is addressing these issues, such as providing medical student internships, expanding pipeline programs, placing more emphasis on placing family doctors on medical school admissions committees, changing admission criteria to favour the selection of candidates with a higher likelihood of choosing family medicine, identifying new family physician mentors and role models, and rigorously evaluating the impact of curricular and extracurricular activities on students [19].

Family medicine is the area of medicine experiencing the most substantial obstacles regarding a shortage of teaching faculty. We hope that the government and the Department of Health will also allocate funds to develop and improve the standards of family medicine doctors. Training medical students to become family doctors is a future plan for medical schools. To create more opportunities for training and advanced studies, ordinary medical students can be further promoted to family doctors after graduation, regardless of their specialty, and actively promote family medicine [20].

Our research demonstrates the distribution of family medicine academic teachers is consistent with the distribution of medical schools in Taiwan, and its distribution is also the same as that of Taiwan's population distribution by the age and educational level of the civilian population aged 15 and over in 2019 [6].

Another challenge faced in medical education is that faculty often have limited time and resources for conducting research. Family medicine faculty in medical schools generally reflect the demographics of family medicine education programs and the activity of members of the Taiwan Academy of Family Physicians [21]. According to the results of our study, promoting younger female physicians to join academic family medicine is a key point. As other studies have suggested, the Family Medicine Educator Fellowship [22], a framework for teaching skills training in family medicine, a course curriculum for family medicine teaching skills training, and mentoring programs for family medicine should be established [23].

Understanding the current status of family medicine faculty in Taiwan medical schools will help improve the process of promoting family medicine academic faculty and resolve barriers in gender, age, and geographic distribution, and will lead to better quality family medicine education in medical schools in Taiwan.

This study had several limitations. First, although our study showed family medicine faculty data in 2019, it does not provide a complete picture of the overall development of

the family medicine faculty. Second, the family medicine workforce questionnaire was only sent to the department of family medicine of medical schools, so department faculty who were teaching family medicine at other schools or colleges were not included. The entire population of family medicine academic distribution is still needed. Future survey evaluations are needed to obtain additional data on academic family medicine.

5. Conclusions

Our study provides the most complete census to date on academic physicians of family medicine in all medical schools in Taiwan. In 2019, there were 5,328 specialists in family medicine in Taiwan, and only 116 (2.2%) served as faculty members in medical schools. The results can provide educational leaders, managers, and decision-makers with new information about the characteristics and current developments of the family medicine department in Taiwan's medical schools. It will help formulate an effective medical school family medicine education plan and solve the problem of the shortage of family medicine faculty in Taiwan's medical schools and the imbalance between men and women. Further research is still needed to build a robust academic family medicine workforce for medical schools in Taiwan.

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