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Original Article

Situation of seven-day service among family medicine clinics in Taiwan: A nationwide survey

Wei-Ting Chang [a], Yi-Jen Wang [b], Hsin-I Leu [c], Tzeng-Ji Chen [b,d], Shinn-Jang Hwang [b,d], Li-Fang Chou [e], Ming-Hwai Lin [b,d,*]

[a] *Family Physician Division, Taipei Veterans General Hospital Yuli Branch, Hualien, Taiwan, ROC*
[b] *Department of Family Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC*
[c] *Taoyuan Veterans Home, Taoyuan, Taiwan, ROC*
[d] *School of Medicine, National Yang-Ming University, Taipei, Taiwan, ROC*
[e] *Department of Public Finance, National Chengchi University, Taipei, Taiwan, ROC*

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Abstract

Background: General medicine practices in England are required to provide services from 8am to 8pm on weekdays and to also open on Saturdays and Sundays. Internationally, however, the literature regarding the temporal availability of primary health care on national levels is scarce.
Methods: To provide such information regarding Taiwan, in this study, all family medicine clinics within Taiwan's National Health Insurance system were stratified by urbanization level, and the opening hours of the clinics were then analyzed. The opening hours of the clinics were downloaded and the data were extracted cross-sectionally in July 2015. For each clinic, the number of open sessions (in terms of morning, afternoon, and evening sessions) per week was calculated. For each urbanization level, the opening ratios for out-of-hours services and for seven-day services were also analyzed.
Results: Among 1621 family medicine clinics, 835 were located in urban areas, 563 were suburban, and 223 were rural. The average numbers of open sessions per week among urban and suburban clinics were higher than among rural clinic (15.7 ± 3.7 and 15.8 ± 3.7 vs. 14.4 ± 4.0). Urban and suburban clinics also had higher opening ratios on weekday evenings and on weekends than rural clinics. Only 53 (3.3%) of all the clinics (29 urban clinics, 18 suburban clinics, and 7 rural clinics) remained open for all 21 sessions of a week.
Conclusion: The great majority of family medicine clinics in Taiwan voluntarily offered out-of-hours services, but only a small minority remained open in all 21 sessions of a week.

Keywords: General practice; National health insurance; Primary health care; Schedules; Taiwan

1. Introduction

Primary care, the cornerstone of any healthcare system, contributes to lower medical costs, medical waste, mortality, and morbidity.[1] Relatedly, increased accessibility of primary care can reduce emergency department visits and hospitalizations.[2] In recent years, the National Health Service (NHS) in England has strongly embraced the policy of seven-day service.[3] That is, general medical practices are required to provide services from 8 am to 8 pm on weekdays and also to open on Saturdays and Sundays.[4] Owing, however, to several drawbacks (such as the lack of a sufficient workforce, financial burdens, and limited family time for healthcare

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* Corresponding author. Dr. Ming-Hwai Lin, Department of Family Medicine, Taipei Veterans General Hospital, 201, Section 2, Shi-Pai Road, Taipei 112, Taiwan, ROC.
E-mail address: mhlin@vghtpe.gov.tw (M.-H. Lin).

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workers, among others), this policy is still widely and fiercely debated.[5–8] According to an Organization for Economic Co-operation and Development (OECD) report, the availability of out-of-hour primary healthcare services varied widely (ranged from 34% to 95%) in selected countries due to different national policies.[9] In countries where citizens are required to register with a family physician, the provision of OOH services was high in the Netherlands and the United Kingdom (95% of primary care practices) but low in Canada (45%). Primary care physicians in the United States were least likely to offer such care despite policy levers with financial incentives have been provided. Internationally, meanwhile, the literature and statistics regarding the temporal availability of primary care on national levels are scarce.

To provide such information regarding Taiwan, in this study, we extensively analyzed the opening hours of all family medicine clinics within Taiwan's National Health Insurance (NHI) system. In addition to providing an overview of clinic schedules, we further stratified the data by urbanization level. This nationwide analysis thus offers valuable information for discussions on health policy worldwide.

2. Methods

2.1. Background information

Taiwan, an island country in East Asia, has a population of 23 million people living in 368 townships, with a population density of 647.5 people/square km.[10] The nation's single-payer NHI system was set up in 1995,[11] and provides comprehensive population coverage (covering more than 99% of residents).[12] An NHI beneficiary is not required to register with a general practitioner. Patients can freely consult any type of physician at contracted clinics and in the outpatient departments of hospitals without referral. Family medicine specialists in Taiwan are trained like general practitioners (GPs) in other countries (e.g., England[4] and Denmark[13]), and although no single type of practitioner is officially authorized to be the sole gatekeeper of healthcare, the number of family medicine specialists is only second to that of internists among physicians practicing outside hospitals.[14]

2.2. Data collection

In the current study, we used the complete lists of contracted healthcare facilities and specialties publicly available on the NHI website,[15] which also posted the opening time schedules for the ambulatory services of each contracted healthcare facility. For the purposes of analysis, the possible opening times were divided into 21 sessions, that is, a morning, afternoon, and evening session, for each of the 7 days of the week. Meanwhile, we also obtained the basic data regarding the 368 townships of Taiwan from the Monthly Bulletin of Interior Statistics provided by the Ministry of the Interior.[10]

2.3. Study design

From the complete list of contracted medical specialties at all healthcare facilities, we first identified 1913 family medicine clinics. We then excluded 285 clinics that had ceased to operate before July 2015. Seven other clinics were also excluded from analysis because their opening time schedules were missing from the NHI web site. Therefore, data for 1621 clinics were included in the study.

Using a programming script, we retrieved the opening time schedules of these 1621 family medicine clinics from the NHI web site. With another programming script, we extracted the data regarding the open sessions for further analysis.

In this study, the 368 towns in Taiwan were classified as urban, suburban, or rural according to the 7-level urbanization stratification developed at Taiwan's National Health Research Institutes.[16] The determining variables in that stratification include the population density, the population ratio of people with college level education, the population ratio of people over 65 years old, the population ratio agriculture workers, and the number of physicians per 100,000 people. In this study, levels 1 and 2 of the stratification were categorized as urban, levels 3 and 4 were categorized as suburban, and levels 5–7 were categorized as rural for the purposes of the analysis. Two counties (Kinmen and Lienchiang) with locations remote from the main island of Taiwan and not included in the original 7-level urbanization stratification, were classified as rural.

We calculated the numbers of open sessions in a week for all the family medicine clinics and then compared them by urbanization category and practice type (solo or group). In addition, for out-of-hours sessions, we computed the ratio of open clinics for each urbanization type. To facilitate international comparisons, we also calculated how many of the clinics provided seven-day service that was similar to that which GPs in the NHS of England are required to provide.[4]

This study was exempted from review by the Institutional Review Board because of anonymized data that are publicly available on application and that involves no existing information collected from human or animal participants.

2.4. Statistical analysis

We used the open-source software Perl (version 5.20.1) (https://www.perl.org/) to retrieve and extract data from the web pages. The data were computed and analyzed in Microsoft Excel 2013. In addition to regular descriptive statistics, we used the software SPSS (version 22) to compare the numbers of open sessions among urban, suburban, and rural areas and among practices of different sizes by using the Mann–Whitney U test. A p-value < 0.05 (two-tailed) was considered statistically significant.

3. Results

Of the 1621 family medicine clinics included in the analysis, 66.6% were solo practices, and most were located in urban (51.5%) and suburban (34.7%) areas (Table 1). On average, the family medicine clinics provided 15.6 ± 3.7 service sessions in a week. While the number of open sessions per week among rural clinics (14.4 ± 4.0) differed statistically from those of urban (15.7 ± 3.7) and suburban (15.8 ± 3.7) clinics ($p < 0.001$ respectively), there was no statistically significant difference between the latter two types of clinics ($p = 0.72$) (Fig. 1). On the other hand, solo practices had, on average, significantly fewer open sessions per week than group practices (15.0 ± 3.8 vs 16.9 ± 3.0, $p < 0.001$). The average number of open sessions for group practices with 3 physicians (17.3 ± 3.0) was larger than that for group practices with 2 physicians (16.6 ± 3.7, $p < 0.001$), while it did not significantly differ from that of group practices with 4 or more physicians (18.3 ± 1.9, $p = 0.059$) (Table 2).

3.1. Out-of-hours services

The details of the open sessions per week are displayed in Table 3. While the opening ratios on weekday evenings for urban and suburban areas were above 80%, those for rural areas were around 60%. In urban areas, the opening ratios were slightly higher on weekday evenings (ranging from 86.1% to 88.7%) than on weekday afternoons (ranging from 79.8% to 84.9%) (Fig. 2). During the weekends, 87.0% of clinics opened on Saturday mornings, but only 10.8% remained open on Sunday evenings. For each of the weekend sessions, the opening ratios in rural areas were lower than those in urban and suburban areas (Table 3).

3.2. Seven-day services

While 1440 (88.8%) of the family medicine clinics were open for at least one session on Saturdays and 416 (25.7%) were open for at least one session on Sundays, only 302 (18.6%) of the clinics had at least one open session on each day of a week. On the other hand, among the 952 (58.7%) clinics that were open for all 15 sessions on weekdays, 237 clinics (134 in urban areas, 79 in suburban areas, and 24 in rural areas) also offered at least one session of services on each day of the weekend. Only 53 (3.3%) clinics (29 urban clinics, 18 suburban clinics, and 6 rural clinics) remained open for all 21 sessions of a week. One third ($n = 18$) of these clinics were solo practices.

4. Discussion

This study investigated the weekly opening time schedules of all contracted non-hospital family medicine clinics in the NHI system in Taiwan. While most previous studies have focused on the workloads of general practitioners and national comparisons of out-of-hours services,[9,17,18] our unprecedented approach of examining the temporal availability of family medicine clinics on a national level should be highly informative to the medical community worldwide.

Although the number of primary care physicians in Taiwan has grown steadily since the start of the NHI system, the physician-to-population ratio for Taiwan is still low compared to those of member countries of the OECD (1.9 versus an average of 3.2 doctors per 1000 people).[14,19] At the same time, Taiwan's NHI system is well known for its higher utilization rate and shorter average waiting time,[12,20] features that might be attributable to the good availability of primary care clinics as revealed in our current study. In contrast to the trend of decreasing open sessions from morning to evening on weekdays among suburban and rural clinics, the opening ratio for family medicine clinics in urban areas of Taiwan was higher on weekday evenings than on weekday afternoons. This result might be related to the work styles of urban residents, e.g., long working hours and unpaid leave.[21,22]

To increase the accessibility of GPs in England, a new policy of seven-day service was started in May 2015 and was expected to extend to all patients by 2020.[4] In Taiwan, in contrast, there is no obligatory regulation requiring seven-day service, and only a relatively small number of family medicine clinics provide such services. More specifically, the opening ratios dropped down to about one-fourth on Sunday mornings and to one-eighth on Sunday evenings for all urbanization areas. It would thus be a difficult task, or at least require substantial changes to current practices, to achieve seven-day service as a standard in Taiwan. Possible solutions might include the arrangement of rotating services on weekends among clinics in the urban and suburban areas and the supply of mobile clinics in rural areas.

Although the Taiwanese family medicine clinics analyzed in this study had, on average, a high number of open sessions per week and a high opening ratio for out-of-hours service, few were found to offer seven-day service as required by the NHS of England. That said, many potentially related issues still need to be explored, e.g., the workloads, life quality, and self-satisfaction of physicians. Meanwhile, the low opening ratio on weekends might lead to more emergency department visits for non-urgent medical problems.[23] Similar findings

Table 1
Demography of Taiwan, July 2015.

Urbanization area	No of towns (%)	Population (%)	Area, km2 (%)	Population density, people/km2	No of family medicine clinics (%)
Urban	69 (18.8)	12,438,579 (53.8)	1993.5 (5.5)	6239.6	835 (51.5)
Suburban	144 (39.1)	8,567,465 (37.1)	8417.6 (23.3)	1017.8	563 (34.7)
Rural	155 (42.1)	2,117,822 (9.2)	25,779.9 (71.2)	82.2	223 (13.8)
Total	368	23,123,866	36,191	647.5	1621

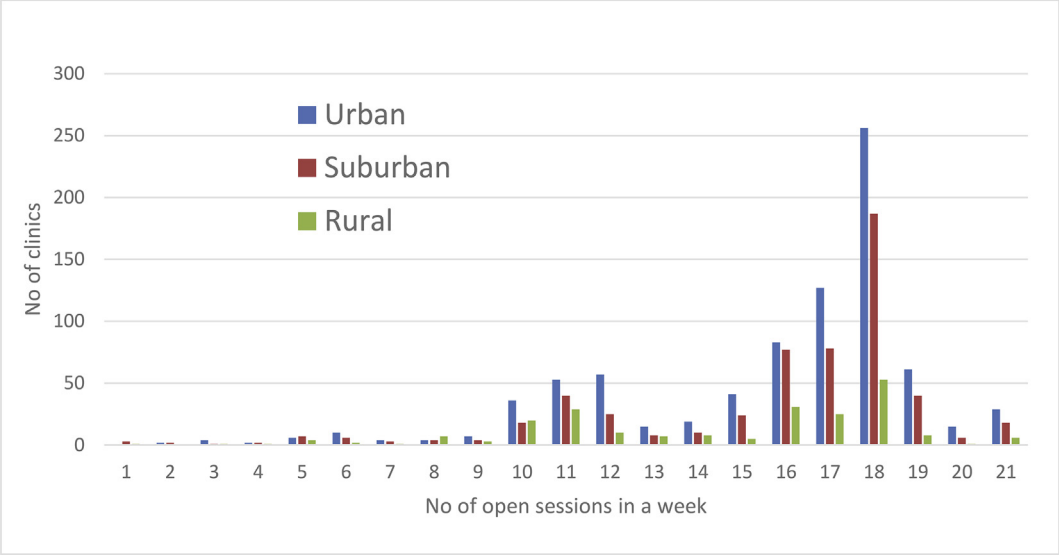

Fig. 1. Distribution of opening sessions of family medicine clinics in a week.

Table 2
Number of open sessions among family medicine clinics, stratified by practice type and size.

Type of practice	Number of clinics (%, n = 1621)	Number of opening sessions (mean ± SD)
Solo practice	1080 (66.6)	15.0 ± 3.8
Group practice	507 (31.3)	16.9 ± 3.0
with 2 physicians	343 (21.2)	16.6 ± 3.7
with 3 physicians	104 (6.4)	17.3 ± 3.0
with ≥4 physicians	60 (3.7)	18.3 ± 1.9
Unknown	34 (2.1)	–

have been noted over pediatrics clinics and obstetrics-gynecology clinics in Taiwan that the numbers of open sessions decreased on weekends (e.g., Saturday nights, Sundays).[24,25] This and other potential impacts on patient health and hospital work deserve further investigation.

This study had some limitations. First, the opening time schedules provided on the NHI website were only roughly separated into three sessions (that is, morning, afternoon, and evening sessions), and the duration of each session and the total hours of opening could not be precisely calculated for each clinic. Second, the opening time schedules provided covered office visits only, while the times for home care visits and out-of-hours telephone consultations were not included. Third, the age and gender of each physician and the service volume of each clinic, three important factors related to the number of open sessions, were not available for analysis. Correlation, if there is any, between the physicians' income and the practice pattern could not be accessed in current study either. Fourth, the availability of family medicine clinics might be overestimated in group practices with other specialties because the NHI administration offered the opening time schedule of the whole clinic instead of

Table 3
Number and percentage of family medicine clinics offering office hours, stratified by session, day of week and urbanization.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Urban (n = 835)							
Morning	809 (96.9)	795 (95.2)	798 (95.6)	789 (94.5)	806 (96.5)	735 (88.0)	194 (23.2)
Afternoon	709 (84.9)	690 (82.6)	674 (80.7)	666 (79.8)	696 (83.4)	505 (60.5)	77 (9.2)
Evening	741 (88.7)	729 (87.3)	719 (86.1)	719 (86.1)	732 (87.7)	423 (50.7)	101 (12.1)
Suburban (n = 563)							
Morning	552 (98.1)	543 (96.5)	541 (96.1)	537 (95.4)	547 (97.2)	503 (89.3)	132 (23.5)
Afternoon	505 (89.7)	491 (87.2)	474 (84.2)	474 (84.2)	495 (87.9)	353 (62.7)	59 (10.5)
Evening	477 (84.7)	467 (83.0)	451 (80.1)	460 (81.7)	472 (83.8)	293 (52.0)	58 (10.3)
Rural (n = 223)							
Morning	203 (91.0)	203 (91.0)	204 (91.5)	202 (90.6)	204 (91.5)	172 (77.1)	36 (16.1)
Afternoon	195 (87.4)	187 (83.9)	178 (79.8)	186 (83.4)	186 (83.4)	103 (46.2)	13 (5.8)
Evening	142 (63.7)	133 (59.6)	131 (58.8)	134 (60.1)	136 (61.0)	75 (33.6)	16 (7.2)
Total (n = 1621)							
Morning	1564 (96.5)	1541 (95.1)	1543 (95.2)	1528 (94.3)	1557 (96.1)	1410 (87.0)	362 (22.3)
Afternoon	1409 (86.9)	1368 (84.4)	1326 (81.8)	1326 (81.8)	1377 (84.9)	961 (59.3)	149 (9.2)
Evening	1360 (83.9)	1329 (82.0)	1301 (80.3)	1313 (81.0)	1340 (82.7)	791 (48.8)	175 (10.8)

Fig. 2. Opening ratio in a week among family medicine clinics at different urbanization areas.

individual specialties. We analyzed the opening sessions of clinics based on their registered physicians, while part-time or outsourcing physicians without registry were not considered for lack of information. Fifth, the availability of practicing clinics is also affected by the medical resources such as the number of academic medical centers, metropolitan or local community hospitals in the same area. Such a factor was not analyzed in our study. Finally, because family medicine specialists are not the sole providers of primary care in Taiwan, the results of this study cannot be seen as providing a comprehensive picture of the status of seven-day service in Taiwan.

Although no obligatory regulation regarding opening times has been imposed on family medicine clinics in Taiwan, the great majority of clinics offered out-of-hours services. As for seven-day service, nearly one fifth of the clinics surveyed were found to be open on each day of a week, but only a small minority remained open for all 21 sessions of a week.

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