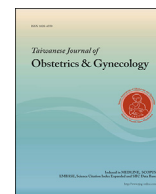




Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

journal homepage: www.tjog-online.com

Original Article

Temporal availability of obstetrics and gynecology clinics in Taiwan: A nationwide survey

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ARTICLE INFO

Article history:

Accepted 16 November 2016

Keywords:

Ambulatory care
Obstetrician–gynecologists
Schedule
Taiwan
Urban–rural health service

ABSTRACT

Objective: Obstetrician–gynecologists are the main providers of women's healthcare. However, workforce shortages and excessive workloads among these providers have been encountered in many countries. While most past studies on this subject have investigated the spatial distribution of obstetrics–gynecology clinics, few have focused on their temporal availability, especially on the national level.

Materials and methods: The weekly opening time schedules (divided into morning, afternoon, and evening sessions) of all obstetrics–gynecology clinics in Taiwan were extracted from the web site of Taiwan's National Health Insurance Administration in July 2015. The numbers of open sessions were then analyzed and stratified by urbanization level and practice type.

Results: Among 742 obstetrics–gynecology clinics in Taiwan, 521 were located in urban areas, 194 in suburban areas, and 27 in rural areas. The numbers of open sessions per week in suburban areas were higher than those in urban and rural areas (16.7 ± 2.6 vs. 15.9 ± 3.1 and 15.9 ± 2.7). Group practices had more open sessions per week than solo practices (16.8 ± 2.8 vs. 15.8 ± 3.0). With respect to after-hours services in rural areas, only two rural obstetrics–gynecology clinics remained open on Sunday mornings, while none remained open on Sunday afternoons and evenings.

Conclusion: Obstetrics–gynecology clinics in Taiwan offered great temporal availability. In addition to the remarkable urban–rural disparity in the distribution of obstetrics–gynecology clinics, the availability of services on Sundays in rural areas demands special attention.

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Introduction

Obstetrician–gynecologists are the main providers of women's healthcare, including care for pregnant women, child delivery services, and the treatment of gynecological diseases and cancer. Moreover, obstetrician–gynecologists are also playing an increasingly important role in providing primary care for women [1–3], especially in rural areas [4]. The ambulatory care provided by obstetrician–gynecologists might include disease prevention and health education [5] and could thus lead to fewer hospitalizations

and shorter hospital stays [6]. While most of the related literature has discussed the shortage of obstetrician–gynecologists [7–10] and the increased workloads of obstetrician–gynecologists with obstetric practices [11,12], studies regarding the temporal availability of ambulatory healthcare for women on the national level remain scarce.

The aim of the current study was to analyze the opening time schedules of all obstetrics–gynecology (OB/GYN) clinics listed by the web site of the National Health Insurance (NHI) Administration in Taiwan. Moreover, we stratified that data by urbanization level and practice type (solo or group practice). The resulting nationwide analysis might provide evidence-based information that would be of relevance to healthcare policy makers.

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Materials and methods

Ethics statement

According to Taiwan's personal data privacy legislation and the regulations of the institutional review board (IRB) at Taipei Veterans General Hospital (Taipei, Taiwan), the utilization of publicly available data is exempt from the IRB approval procedure.

Study design and data extraction

In the current study, we extracted the complete lists of contracted healthcare facilities (2976_1_hospbsc.zip), service items of the healthcare facilities (2978_1_service.zip), and the specialties in the healthcare facilities (2980_1_detafunc.zip) from the NHI web site [13]. We identified 984 OB/GYN clinics in these lists, but excluded 240 clinics which had terminated their contracts prior to July 2015. We also excluded two other listed OB/GYN clinics because there were no opening time schedules for those clinics shown on the NHI web site. Finally, a total of 742 OB/GYN clinics were included in the current study.

The opening time schedules of each these OB/GYN clinics, all of which were posted on the NHI web site, were divided into three sessions (morning, afternoon, and evening) for each day of the week. We retrieved the opening time schedules of the 742 OB/GYN clinics from the web site using a programming script. These data were extracted for further analysis. Furthermore, we used another programming script to obtain basic data for 368 townships in Taiwan, including the female population of each town, from the Monthly Bulletin of Interior Statistics published by the Ministry of the Interior [14].

The 368 towns were classified into urban, suburban, and rural areas according to the definition of 7-level urbanization published by Taiwan's National Health Research Institutes [15]. The seven levels were determined by the following variables: population density, population ratio of people with college educational levels, population ratio of elderly people over 65 years old, population ratio of agricultural workers, and the number of physicians per 100,000 people. We categorized levels 1–2 as urban areas, levels 3–4 as suburban areas, and the other levels as rural areas. Two isolated islands, Kingmen and Lienchiang, which were not included in the 7-level urbanization and are located at remote distances from the main island of Taiwan, were categorized as rural areas.

We analyzed the numbers of open sessions in a week for all the OB/GYN clinics, and compared the differences in open sessions for the three areas and distinct practice types (solo and group practices). For after-hours services, we also compared the open ratios on

weekday evenings, Saturdays, and Sundays, for the different urbanization areas.

Statistical analysis

We retrieved and extracted data from the web site using the open-source Perl software (version 5.20.1) (<https://www.perl.org/>). The descriptive statistics were analyzed in Microsoft Excel 2013. Moreover, the Mann–Whitney U test in the SPSS, version 22, software was used for comparing the numbers of open sessions among the urban, suburban, and rural areas, and among the different practice types (solo versus group practices). A p -value < 0.05 (two-tailed) was considered statistically significant.

Results

Among the 742 OB/GYN clinics, although the overwhelming majority were located in urban and suburban areas (70.2% and 26.1%, respectively), the minority, on average, cared the most female population per clinic (Table 1). About 67.9% OB/GYN clinics were solo practices (Fig. 1). However, OB/GYN clinics with group practices provided significantly more open sessions per week than those with solo practices (16.8 ± 2.8 vs. 15.8 ± 3.0 , $p < 0.001$) (Fig. 1).

Overall, the mean number of open sessions that OB/GYN clinics provided in a week was 16.1 (SD = 3.0). While the number of open sessions in a week was statistically larger in suburban areas than urban areas (16.7 ± 2.6 vs. 15.9 ± 3.1 , $p = 0.001$), there was no significant difference between urban and rural areas (15.9 ± 3.1 vs. 15.9 ± 2.7 , $p = 0.876$) or suburban and rural areas (16.7 ± 2.6 vs. 15.9 ± 2.7 , $p = 0.128$) (Fig. 2).

During the daytime on weekdays (morning and afternoon), the open ratios were highest in rural areas (average 99.6%), and then decreased gradually from suburban (average 95.0%) to urban (average 89.6%) areas (Table 2). As to after-hours services, generally speaking, the open ratios in rural areas were lower than those in urban and suburban areas (Fig. 3). Comparing the number of after-hours open sessions, OB/GYN clinics in suburban areas offered more office hours than those in urban areas ($p = 0.029$).

Discussion

According to a survey of the American Congress of Obstetricians and Gynecologists (ACOG) in 2012, among out-of-hospital obstetrician–gynecologists, about one half practiced in suburban areas (45.9%) and 70% practiced in group practices [16]. In contrast with those ACOG survey results, the results of this study indicate that most of the OB/GYN clinics in Taiwan were solo practices (about

Table 1
Distribution of obstetrics–gynecology (OB/GYN) clinics in Taiwan, July 2015.^a

Urbanization area	No of towns	Female population ^a	Area (km ²) ^a	Female population density (people/km ²) ^a	No of OB/GYN clinics (%)	Average population cared by a clinic (people/clinic)
Urban	69	6,279,038	1990.9	3149.8	521 (70.2)	12,051.9
1	27	2,671,439	331.4	7991.1	241	11,084.8
2	42	3,607,599	1659.5	2174.3	280	12,884.3
Suburban	144	4,221,233	8418.8	501.5	194 (26.1)	21,758.9
3	57	2,478,912	2477.6	1001.1	95	26,093.8
4	87	1,742,321	5941.2	293.3	99	17,599.2
Rural	155	1,235,511	25,780.2	47.9	27 (3.6)	45,759.7
5	35	233,266	2766.0	84.3	4	58,316.5
6	61	459,353	11,849.9	38.8	8	57,419.1
7	49	473,850	10,983.8	43.1	14	33,846.4
Remote isles	10	69,042	180.5	382.5	1	69,042
Total	368	11,735,782	36,189.9	—	742	—

^a Calculated from the basic data for 368 towns published by the Department of Statistics, Ministry of the Interior, of the Taiwan government [14].

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