Workload of Attending Physicians at an Academic Center in Taiwan

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Background: Since the fee-for-service reimbursement mechanism has been under the global budget of the National Health Insurance program, physicians' workloads have been increasing. Attending physicians in medical centers usually have long working hours because of their clinical work as well as teaching, research, and other administrative responsibilities. Many studies regarding reasonable work hours for physicians have been undertaken globally, but few have been conducted in Taiwan. In this study, we focused on the difference in working hours among physicians in different departments.

Methods: Using attending physicians from a major teaching hospital as the study population, we adopted self-administered questionnaires to investigate physicians' time allocations for 4 major categories: clinical work, teaching, research, and administrative work. We distributed 432 questionnaires and received 380 filled-out questionnaires, yielding a response rate of 88%. After eliminating questionnaires with incomplete responses, the valid sample size was 376. We used *t* test and 1-way ANOVA to analyze the association between physicians' characteristics and workload and used multiple linear regression to examine factors influencing physicians' work hours.

Results: The average weekly work time among attending physicians was 65.6 hours; physicians under the age of 40 worked an average of 69.8 hours. Males worked an average of 66.2 hours weekly and females an average of 62.7 hours. Total work hours and hours of clinical work, teaching, research, and administrative work all reached significant differences among departments. Physicians who were under 40 years old, those with a doctoral degree, those with a teaching position as associate professor or above, and those working in anesthesiology had longer total work hours.

Conclusion: This study found that work hours among departments differed significantly and that physicians in surgical departments spend the longest hours in clinical work. Those in administrative positions are most involved in clinical work. However, work hours do not definitely represent work intensity, and to define the workload by working hours may be inappropriate for some departments. This possible difference between work hours and work intensity merits further consideration. [*J Chin Med Assoc* 2010;73(8):425–430]

Key Words: attending physician, work hours, workload

Introduction

The National Health Insurance (NHI) program in Taiwan began in March 1995 and adopted a fee-for-service reimbursement mechanism under a fixed annual budget.[1] Under the fee-for-service system, the service volume has increased rapidly, while the global budget design has shifted the financial risk to health care providers, causing various problems in different clinical departments.

In 2010, the NHI's total expenditures are predicted to be NT$493.9 billion, with hospital services, including outpatient and inpatient services, accounting for approximately 66% of the entire amount, which is approximately US$10 billion. Under the global budget, the received payment is calculated using the floating

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point value that is varied according to service volume. Referring to the case of Germany, which has implemented a global budget system since 1990, a decline in the treatment dollar value implies that the workload of attending physicians is getting much heavier.[2]

In major hospitals, attending physicians are usually responsible for clinical work as well as teaching, research, and administrative tasks. Studies have shown that physicians are becoming dissatisfied with their jobs due to increasing administrative duties,[3] and some physicians have suggested that assistants should deal with administrative tasks so that physicians can spend more time caring for patients.[4]

Mache et al[5] used the instant recording method to investigate the work hours of physicians in respiratory care institutions. Results from their study indicate that physicians work an average of 9 hours and 15 minutes per day. The study also suggested that a medical assistant system should be established in order to reduce physicians' workload. In a survey of physicians' job satisfaction at hospitals in Norway and Germany, physicians were least satisfied with their work hours, among 7 job satisfaction indicators.[6] These studies highlight the impact of long work hours on physicians. Most studies have investigated the workload or job satisfaction of physicians, while seldom looking into the factors impacting length of work hours. In the current study, we looked at attending physicians from a major teaching hospital. We examined the factors impacting work hours and further analyzed the difference in work hours among departments. We hope that the results of this study can suggest modifications to physicians' workloads and related changes to the global budget scheme.

Methods

We conducted a cross-sectional study to investigate the work hours of attending physicians in a teaching hospital, using self-administered questionnaires. There are about 2,900 beds in this teaching hospital, 443 attending physicians, and 580 residents. The study took place from January to December, 2008; 432 questionnaires were distributed and 380 returned, yielding a response rate of 88%. After eliminating those with missing or incomplete answers, the valid sample size was 376.

The questionnaire asked about allocations of time in 4 categories: (1) clinical work—outpatient and inpatient services, such as ambulatory services, examinations and operations, surgeries, ward rounds, and filling out medical records; (2) teaching—academic article discussion, case discussion, medical student instruction, teaching rounds, and other teaching duties; (3) research—lab experiments, research meetings, research proposals and report writing, publication, and advanced training; and (4) administrative work—attending administrative or management conferences, serving as administrative managers, and so on.

The questionnaire was further divided into 2 sections. The first section requested basic information such as age, sex, education level, schools attended, service seniority, whether the physician held a teaching position, and whether the physician was serving as a manager, and in which department. The second section asked about classification and characteristics of physicians' specialties. Specialties included internal medicine, surgery, anesthesiology, orthopedics, obstetrics and gynecology, pediatrics, diagnostic radiology, neurology, psychiatry, dentistry, ophthalmology, otolaryngology, pathology, family medicine, dermatology, emergency medicine, administration and research, and others (e.g. rehabilitation, traditional medicine). This section asked about the potential impact of the number of residents on attending physicians' time spent in clinical work and teaching, how duties differed for residents with varying service seniority, residents working for more than 4 years or under 3 years, and the number of teaching rounds.

In the statistical analyses, the basic demographics of the study samples were displayed as mean and standard deviation. We performed *t* tests and 1-way analysis of variance to examine the impact of demographic factors and departments on the distribution of work hours. We conducted stepwise multiple linear regression to study the factors impacting attending physicians' work hours, with statistical significance set at $p < 0.05$. The data set was built in Microsoft Excel, and the statistical analyses were performed using SAS version 9.1 (SAS Institute, Cary, NC, USA).

Results

The average weekly work time of attending physicians was 65.6 ± 16.3 hours (Table 1). Work time could be divided into 4 categories: the average time spent in clinical work was 30.7 ± 13.3 hours, accounting for 46.8% of the entire working hours, and the average times spent on teaching, research, and administrative work were 16.9 ± 9.5 (25.7%), 12.1 ± 9.8 (18.4%), and 5.9 ± 6.9 (9.0%) hours, respectively.

Our study sample had a higher proportion of men (314, 83.5%) than women (62, 16.5%). The average weekly working time was 66.2 hours for male attending physicians and 62.7 hours for female attending physicians, although this difference was not statistically

Table 1. Distribution of work hours according to different demographic characteristics ($N = 376$)

Variable	*n* (%)	Total working hours		Clinical work		Teaching		Research		Administrative work	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (yr)											
≤40	92 (24.5)	69.8	18.2	30.78	14.00	17.43	9.44*	16.69	10.91†	4.94	6.72†
41–45	55 (14.6)	63.5	15.1	29.92	10.76	15.08	8.26	14.03	9.82	4.42	5.78
46–50	86 (22.9)	63.9	14.1	32.25	12.76	14.73	8.15	11.65	8.56	5.23	5.43
51–55	66 (17.6)	64.9	17.5	27.90	13.42	19.68	12.28	10.77	9.63	6.53	6.07
≥56	77 (20.5)	64.7	15.2	31.99	14.23	17.44	8.68	6.81	6.42	8.48	9.09
Sex											
Female	62 (16.5)	62.7	17.5	30.74	12.44	15.98	10.14	11.26	7.79	4.67	3.94*
Male	314 (83.5)	66.2	16.0	30.73	13.43	17.04	9.42	12.25	10.13	6.18	7.33
Education level											
Bachelor's	302 (80.3)	65.5	16.1	31.10	13.27	17.00	9.55	11.43	9.13†	5.99	7.01
Master's	21 (5.6)	59.7	16.1	30.63	12.28	14.24	10.50	10.45	8.88	4.38	3.61
Doctor's	53 (14.1)	68.6	16.9	28.68	13.63	17.15	9.12	16.47	12.40	6.25	7.27
School of graduation											
Public school	233 (62.0)	65.5	16.3	30.76	13.90	16.54	9.41	12.34	9.79	5.87	6.73
Private school	113 (30.1)	67.1	16.7	31.73	11.72	18.23	9.99	11.37	9.37	5.80	6.81
Other	30 (8.0)	60.6	13.4	26.70	13.25	14.23	8.18	12.78	11.27	6.93	8.57
Service seniority (yr)											
≤10	70 (18.6)	68.1	18.2	32.66	15.00	16.68	9.18	14.34	10.45	4.38	5.06
11–15	66 (17.6)	67.1	17.7	28.87	11.09	16.58	8.73	15.97	10.27	5.69	8.25
16–20	79 (21.0)	65.0	13.6	29.99	13.32	16.48	9.25	13.38	8.94	5.16	4.90
21–25	75 (20.0)	63.1	15.6	30.35	13.71	16.05	10.78	10.73	10.34	5.94	6.48
≥26	86 (22.9)	65.3	16.3	31.61	12.86	18.30	9.60	7.26	6.60	8.09	8.45
Having an administrative position											
No	275 (73.1)	65.7	16.6	30.74	12.81*	17.09	9.75*	13.43	10.36	4.41	5.40‡
Unit chief	82 (21.8)	66.6	15.6	32.93	14.27	17.25	9.04	8.94	7.05	7.48	5.67
Department chief or above	19 (5.1)	60.5	14.2	21.15	11.34	11.89	7.22	6.16	4.83	21.34	10.39
Having a teaching position											
No	218 (58.0)	64.5	15.8	29.84	13.41	16.11	9.37	12.40	10.10	6.16	7.28
Lecturer	93 (24.7)	64.6	16.6	30.53	12.48	17.31	10.25	12.46	9.91	4.30	4.64
Assistant professor or above	65 (17.3)	70.8	16.5	34.00	13.54	18.77	8.86	10.48	8.36	7.50	7.88
Involved in teaching rounds											
No	315 (83.8)	65.8	16.4	30.73	13.77	17.12	9.68	12.04	9.84	5.94	7.16
Yes	61 (16.2)	64.5	15.8	30.73	10.33	15.58	8.71	12.29	9.54	5.89	5.46
Specialty											
Internal medicine	101 (26.9)	65.7	15.5†	27.77	8.82‡	18.97	10.15‡	13.59	9.81‡	5.38	6.14‡
Surgery	35 (9.3)	72.8	16.0	42.17	10.50	18.09	9.39	8.17	6.62	4.37	4.73
Anesthesiology	15 (4.0)	78.9	20.1	30.65	17.84	20.87	11.45	15.63	11.23	11.73	14.37
Orthopedics	13 (3.5)	67.6	10.7	44.27	10.48	12.64	4.70	6.38	5.49	4.27	3.64
Obstetrics & gynecology	12 (3.2)	74.9	18.1	40.82	14.13	21.75	8.62	9.00	6.68	3.29	2.65
Pediatrics	16 (4.3)	70.0	17.2	28.89	9.51	23.41	10.17	12.00	7.69	5.70	3.50
Diagnostic radiology	19 (5.1)	65.8	18.4	37.17	19.79	16.90	12.69	5.47	4.21	6.29	8.76
Neurology	33 (8.8)	63.5	16.6	34.14	13.08	13.91	6.74	12.72	8.34	2.72	2.58
Psychiatry	12 (3.2)	61.9	15.0	26.37	6.15	18.67	7.76	10.63	8.84	6.25	4.37
Dentistry	12 (3.2)	63.8	14.0	36.16	11.15	13.44	4.73	8.38	7.68	5.83	3.04
Ophthalmology	20 (5.3)	58.1	14.3	33.16	10.68	11.01	5.61	11.55	7.34	2.37	1.60

(*Contd*)

Table 1. (*Continued*)

Variable	*n* (%)	Total working hours		Clinical work		Teaching		Research		Administrative work	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Specialty (*contd*)											
Otolaryngology	13 (3.5)	68.9	16.5	32.67	7.45	14.51	7.29	16.38	13.12	5.32	7.90
Laboratory medicine	15 (4.0)	62.1	13.9	24.91	14.32	17.29	6.88	11.62	8.58	8.23	8.75
Family medicine	9 (2.4)	57.0	13.2	22.74	5.29	16.02	7.60	8.11	5.93	10.14	4.26
Dermatology	6 (1.6)	54.2	8.3	28.40	10.71	8.92	2.97	9.83	9.33	7.00	4.59
Emergency medicine	12 (3.2)	68.4	15.3	20.64	14.39	23.86	12.21	13.25	9.63	10.67	9.19
Administration & research	18 (4.8)	55.7	9.9	11.44	7.98	9.58	6.28	24.11	17.46	10.53	11.61
Other	15 (4.0)	60.2	18.2	27.55	6.92	12.67	8.44	11.50	6.39	8.47	5.66

*$p < 0.05$; †$p < 0.01$; ‡$p < 0.0001$. SD = standard deviation.

significant ($p = 0.9164$). Both sexes spent 30.7 hours per week on clinical tasks. Overall, female physicians spent 4 hours fewer working than male physicians. Male physicians spent more time teaching, researching, and in administrative work than female physicians, which could have led to this difference.

The education level of attending physicians played a significant role on time spent undertaking research ($p < 0.01$). On average, physicians with a doctoral degree spent 5–6 more hours in research than their colleagues with bachelor's or master's degrees.

Whether or not an attending physician held an administrative position was significantly correlated with time spent on clinical work ($p = 0.003$), teaching ($p = 0.03$), and administrative tasks ($p < 0.001$), but was not significantly correlated with time spent on research. For attending physicians who were also the chief of a department, time spent on clinical work, teaching, and administrative work was less than for general attending physicians.

Physicians' specialties were significantly correlated with total work hours ($p = 0.0002$), time spent on clinical work ($p < 0.001$), teaching ($p < 0.001$), research ($p < 0.0001$), and administrative work ($p < 0.0001$). Attending physicians in the anesthesiology department had the longest average weekly working time of 78.9 hours, followed by physicians in the obstetrics and gynecology department and surgery department, which were 74.9 and 72.8 hours, respectively.

Table 2 shows the results of the stepwise multiple linear regression analysis. It suggests that attending physicians under 40 years of age, those with doctoral degrees, those who were from private schools, those serving as an associate professor or above, and those working in the departments of anesthesiology, obstetrics and gynecology, or surgery had a longer work week.

Table 2. Multiple regression analysis of total work hours

Variable	Coefficient	Standard error	*p*
Intercept	61.6	1.35	< 0.0001
Age (ref = ≥ 56 yr)			
≤ 40 yr	6.7	1.92	0.001
Education level (ref = Bachelor degree)			
Doctorate	6.7	2.68	0.013
School of graduation (ref = Public)			
Private	3.1	1.78	0.083
Other	–6.1	3.28	0.063
Teaching position (ref = No)			
Assistant professor or above	6.3	2.18	0.004
Specialty (ref = Internal medicine)			
Surgery	6.3	2.76	0.024
Anesthesiology	10.1	4.11	0.014
Obstetrics & gynecology	7.4	4.51	0.104
Ophthalmology	–6.7	3.54	0.058
Family medicine	–8.6	5.18	0.099
Administration & research	–10.2	3.79	0.007
Other	–5.9	4.05	0.146
F value	5.640		
p value	< 0.0001		
Adjusted R^2	0.129		

In the additional analysis concerning hours per week of clinical work (Table 3), attending physicians serving as an associate professor or above, those without administrative duties, and those working in the department

Table 3. Multiple regression of clinical work hours

Variable	Coefficient	Standard error	*p*
Intercept	25.6	1.01	< 0.0001
Teaching position (ref = No)			
Assistant professor or above	3.4	1.56	0.0317
Administrative position (ref = No)			
Department chief or above	–7.5	2.70	0.0058
Specialty (ref = Internal medicine)			
Orthopedics	10.3	3.23	0.0016
Obstetrics & gynecology	10.4	3.30	0.0018
Diagnostic radiology	12.0	2.75	< 0.0001
Emergency medicine	–8.6	3.31	0.0097
Administration & research	–15.2	2.79	< 0.0001
Person-months of residence with a ≥ 4-yr service seniority	0.04	0.01	< 0.0001
F value	19.760		
p value	< 0.0001		
Adjusted R^2	0.286		

of orthopedics, obstetrics and gynecology, or diagnostic radiology spent more time on clinical work. In addition, attending physicians with a service seniority of more than 4 years or working in departments with more residents spent more time on clinical work.

In studying the number of residents with a service seniority of more than 4 years among departments, we found that departments with more fellows had heavier workloads.

Discussion

This study retrospectively investigated the self-reported work hours of attending physicians. The 88% response rate and 376 valid samples generated objective and representative results, which is the major contribution of this study.

In surveys of work hours of attending physicians abroad, researchers have shown that Norwegian physicians work an average of 52.8 hours per week,[7] and physicians from the United States work 53.9 hours per week.[8] In this study, we found that physicians in Taiwan work an average of 65.6 hours per week, which is much higher than in Norway and the United States. According to statistical reports from 1976 to 2008 published by the U.S. Census Bureau, within the 22 years from 1986 to 2008, the work time of non-resident physicians decreased from 52 hours per week to 50 hours per week.[9] These studies reveal the comparably high workload of attending physicians in Taiwan.

This study also found significant differences in physicians' total work time and time spent on clinical work, teaching, research, and administrative tasks across various departments. Physicians in the anesthesiology department worked 24.7 hours per week more than physicians in the dermatology department (a 45.6% difference), the department with the shortest work hours. Physicians in the department of surgery worked an average of 72.8 hours per week, 18.7 hours more than those in dermatology (a 34.4% difference). By distributing these additional working hours over 7 days, the results suggest a 4–5 hour difference in hours worked per day. Work hours undoubtedly play an essential role when young physicians are choosing their specialty. The significant differences in work hours between departments could lead to future differences in physicians' manpower distribution.

According to a U.S. Department of Labor 2010 report, physicians, especially those working in surgical departments, have long and unstable work hours. In 2008, 43% of physicians and surgical physicians had a weekly work time of more than 50 hours.[10] According to our study, the workloads of physicians in Taiwan are higher than in the United States, with attending physicians under the age of 40 working an average of 69.8 hours per week.

The samples used in this study were from a major teaching hospital. Combining physicians' work hours for outpatient and inpatient services, attending physicians in the department of obstetrics and gynecology had an average weekly work time of 74.9 hours, which was an average of 10.7 hours a day. This number is higher than the 9 hours and 24 minutes that physicians in a similar department in Germany work per day.[11] Under the NHI program, the weekly work hours of attending physicians in the department of obstetrics and gynecology are much higher than those of physicians in similar departments in Germany.

In 2007, a survey of 1,219 primary care/family physicians was conducted in Ontario, a province of Canada. The results showed that female physicians spent 35 hours per week caring for patients, 22.5% less than male physicians' 42.9 hours per week.[12] In our study, we found no significant difference in total work time and clinical work time between male and female attending physicians, but compared to male physicians,

female physicians spent less time on teaching, research and administrative work. A study in Norway used the number of outpatients as an indicator of workload and found that on average, male physicians had more outpatients then did female physicians.[13] The impact of the increasing proportion of female attending physicians on physicians' long-term capabilities is worth considering.[14]

Many studies show that the average work hours of attending physicians in Taiwan are much higher than in other countries. Even when compared with Canada or Germany, which also have national health insurance programs, our average weekly work hours is 10–20 hours longer. In recent years, programs associated with physician health promotion have received increasing attention, and have been advocated in countries such as Canada, Australia, and England. Many countries have also set a threshold on work hours for physicians and attending physicians. Furthermore, the European Union passed a Working Time Directive in 1993 to reduce physicians' work hours year after year, for instance, to 48 hours per week in 2009.

In this study, using work hours as an indicator of workload helped to explain the working conditions of most departments. However, do long work hours really represent heavy workloads? Undoubtedly, some departments are not comparable in intensity with, for example, the surgery or orthopedics departments; this was 1 limitation of our study. In addition, the retrospective self-reporting of working hours could perhaps lead to overestimation. However, as the basic unit of work time was the minute rather than the hour, any overestimation may not have been significant.

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