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Effect of Night-Clinic Closure on Physicians' Workload and Satisfaction

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Abstract

Excessive overtime work, which is a serious problem among Chinese physicians, is the primary reason for night clinic closure policies. The aim of this study was to evaluate the effects of such policies on physicians' workload and satisfaction. Physicians at the hospital, which closed its night clinic in 2017, were selected as the intervention group, and those at another hospital, which still operates a night clinic, were chosen as the control group. In total, 829 participating physicians self-reported their characteristics and responded to questions on three effect indicators: weekly hours worked, work–family balance, and job satisfaction; the index years were for 2016 and 2017. A pre–post-with-control-group study design and the difference-in-difference (DID) methodology were employed to evaluate the effect of night clinic closure. After adjusting for physicians' characteristics, the effect of all variables, except hours worked per week, on work–family balance and job satisfaction remained significant. Although the adjusted effect on hours worked per week was not significant, our results suggest that minor policy changes that reduce the workload of physicians may nonetheless benefit this group. However, as the satisfaction scores remained low, other policies should be implemented to relieve the workload and improve satisfaction among physicians.

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Introduction

The primary aim of night clinics is to ensure the confidentiality of patients, especially those with mental health problems or HIV infection [1,2,3]. Night clinics, which serve as an extension to outpatient services, operate after regular outpatient services close and involve a set of specialists working a new shift and who continue to provide services, usually from 16:00/17:00 to 20:00/ 22:00. The target patient groups have been reported to be satisfied with night clinics due the short waiting times and the guarantee of confidentiality [4, 5].

As a result of the universal coverage of health insurance in China, the number of patients visiting hospitals has increased sharply [6,7,8]. Night clinics were established by many hospitals, including tertiary hospitals, to improve the accessibility of healthcare services. There are two aims of night clinics in China. The first is to provide an alternative to crowded day clinics. The second is to meet the needs of office workers who can more easily visit doctors after work [9]. Research performed after years of night clinic operation has shown that these facilities have not been fully utilized by patients, who are more likely to visit them to obtain prescriptions for medicines than examinations, where many types of the latter are not available in the evening [10, 11]. More importantly, physicians frequently complain of long work hours and a lack of vacation time [12]. The average number of hours worked per week was 50.9 for male physicians and 49.8 for female physicians [13]. These figures are substantially higher than the 40-hour legal limit on hours worked per week [14]. Indeed, long work hours are the most important contributor to physician dissatisfaction, which is negatively associated with patient satisfaction and healthcare quality [15]. Thus, in 2017, a tertiary teaching hospital located in Beijing closed its night clinic to reduce the physicians' workload.

The aim of this study was to examine the effect of night clinic closure on physicians' workload and satisfaction by comparing intervention and control groups.

Materials and Methods

Hypothesis

In this study, the physician was the unit of analysis. We hypothesized that the number of hours physicians worked per week would decrease, and that their satisfaction would increase, as a result of closing the night clinic.

A difference-in-difference model (DID) was used to examine whether closing the night clinic was associated with the number of hours worked per week and the satisfaction of physicians. The DID is widely applied to evaluate the net effect of policies on the targets of an intervention. Its basic approach involves measuring the change in a certain indicator experienced by both an intervention and a control group, by comparing data gathered before and after the implementation of a policy. The effect of the policy is assessed by comparing the changes in the intervention group with those in the control group. Finally, the net effect is calculated through linear regression analysis performed while controlling for confounders. In this study, the intervention group was drawn from a tertiary teaching hospital located in Beijing that closed its night clinic in 2017. The control group consisted of physicians from a tertiary teaching hospital in the same city that still operated a night clinic. The DID model can be expressed as follows:

$$Y = \beta_0 + \beta_1 group + \beta_2 year + \beta_3 group \times year + \beta_i X_i + \varepsilon.$$

In this study, Y is the number of hours physicians worked per week plus the scores for work–family balance and job satisfaction. We set the value of the dummy variable as 1 for physicians from the hospital that closed its night clinic (intervention group), and as 0 for the control group. β_1 thus captures all time-independent differences between the intervention and control groups. *Year* was also treated as a dummy variable, with a value equal to 1 for the period of time following the closure of the night clinic (2017), and a value of 0 for the period of time before its closure (2016). β_2 reflects differences in the variables of interest before versus after the night clinic closed. The coefficient β_3, which reflects the interaction between the intervention and time in the regression analysis, represents the DID estimate of the net effect of closing the night clinic. X_i refers to the control variables, including gender, age, years in practice, academic rank, educational background, marital status, number of

children, management position, specialty, and so on; this, *X* reflects the unobservable factors that may affect the outcome variables.

Data Sources

Baseline and final investigations were conducted in December 2016 and December 2017, respectively. The China–Japan Friendship Hospital, which closed its night clinic at the beginning of 2017, was treated as the intervention group. Peking Union Medical College Hospital was randomly selected from among the hospitals that still operated a night clinic during this period to serve as the control group. Both hospitals were tertiary teaching hospitals located in Beijing. Our sample reflected the actual proportion of physicians holding each of three academic ranks (residents, attendings, and chiefs). This method yielded 200 and 300 physicians from each sampled hospital in 2016 and 2017, respectively. The final sample in 2016 included 150 physicians from the intervention hospital and 163 from the control hospital; the 2017 sample included 256 and 260 physicians from the intervention and control hospitals, respectively.

The survey protocol was reviewed and approved by the Research Ethics Committee of the Chinese Academy of Medical Science Peking Union Medical College. An informed consent form, including an explanation of the purpose of the study, was included on the first page of the survey. After accepting the terms of participation, the physicians completed the online questionnaire.

Study Instrument Design

The selected physicians were invited to complete online self-administered questionnaires that solicited information on their personal characteristics (e.g., age, gender, marital status, educational background, and number of children), practice characteristics (e.g., specialty, hours worked per week, years in practice, management position, and academic rank), and satisfaction. The following items were used to measure physicians' level of satisfaction: 'I maintain a good balance between work and family' and 'I am satisfied with my current work'. Respondents rated each of these items on the following five-point Likert scale: 'strongly agree', 'agree', 'neither agree nor disagree', 'disagree', or 'strongly disagree'.

Statistical Analysis

Descriptive statistics were used to compare workload and satisfaction indicators between hospitals with and without a night clinic. Continuous variables are presented as means ± standard deviation (SD), and differences between intervention and control groups were compared with Student's t-tests. Categorical variables are presented as percentages, and chi-square tests were used to analyze differences between the two groups. The DID model was used to calculate the effect of closing the night clinic on the variables of interest. After controlling for confounders, including age, gender, marital status, and number of children, we used general linear regression to estimate the net effect of closing the night clinic. All analyses were performed using the SAS software packages (ver. 9.4; SAS Institute Inc., Cary, NC, USA). All tests for statistical significance were two-sided, and the significance level was set at $\alpha=0.05$.

Results

General Characteristics of Participants

As shown in Table 1, the baseline survey was completed by 150 and 163 physicians from the intervention and control groups, respectively. Except for monthly salary, there were no significant between-group differences in gender ($p=0.098$), age ($p=0.515$), years in practice ($p=0.508$), or educational background ($p=0.580$). In total, 38.0% of physicians in the intervention group reported that their salary was less than 5000 CNY, which was higher than the proportion in the control group (8.0%, $P<0.001$).

The post-survey included 256 physicians in the intervention group and 260 in the control group. The results were similar to those of the baseline survey, in that there were no significant between-group differences in gender ($p=0.786$), age ($p=0.310$), years in practice ($p=0.955$), or educational background ($p=0.955$). The physicians in the intervention group again reported lower salaries than those in the control group ($P<0.001$). The proportion of those with a monthly salary more than 10 thousand CNY was 6.7% in the intervention group, whereas it was 79.2% in the control group (Table 1).

Unadjusted Effects of Closing the Night Clinic

Table 2 compares the hours worked per week

Table 1. Characteristics of participating physicians

Characteristic	2016		2017	
	Intervention group N (%)	Control group N (%)	Intervention group N (%)	Control group N (%)
Number	150	163	256	260
Monthly salary CNY				
<=5000	57(38.1)	13(8.0)	51(19.9)	27(10.4)
5001–10000	91(60.7)	45(27.6)	188(73.4)	27(10.4)
10001–20000	1(0.7)	90(55.2)	15(5.9)	127(48.8)
>=20001	1(0.7)	15(9,2)	2(0.8)	79(30.4)
Gender				
Male	76(50.7)	68(41.7)	108(42.2)	105(40.4)
female	74(49.3)	95(58.3)	148(57.8)	155(59.6)
Age				
<=30	42(28.0)	52(31.9)	41(16.0)	57(21.9)
31–40	80(53.3)	143(87.7)	65(25.4)	123(47.3)
41–50	19(12.7)	51(31.3)	37(14.5)	60(23.1)
>=51	9(6.0)	10(6.1)	20(7.8)	20(7.7)
Years in practice				
<=10	102(68.0)	98(60.1)	153(59.8)	142(54.6)
11–20	32(21.3)	37(22.7)	83(32.4)	96(36.9)
21–30	14(9.3)	21(12.9)	19(7.4)	20(7.7)
>=31	2(1.3)	7(4.3)	1(0.4)	2(0.8)
Educational background				
Bachelor's and below	8(5.3)	18(11.0)	17(6.6)	30(11.5)
Master's	41(27.3)	53(32.5)	59(23.0)	71(27.3)
Doctorate	101(67.3)	92(56.4)	180(70.3)	159(61.2)

Table 2. Unadjusted effect of night-clinic closure

	Before	After	Change	DID
Hours worked per week				-1.16
Intervention group	49.35	50.43	1.08	
Control group	50.56	52.80	2.24	
Work–family balance				0.5
Intervention group	2.53	2.71	0.18	
Control group	2.63	2.31	-0.32	
Job satisfaction				0.62
Intervention group	1.98	2.62	0.64	
Control group	2.20	2.22	0.02	

DID, difference-in-difference

and scores for work–life balance and job satisfaction between physicians in the intervention group and those in the control group, based on all data gathered over the 2-year study period. According to the unadjusted analysis (i.e., not controlling for monthly salary, gender, age, marital status, or number of children), the DID estimate was negative for the workload indicator and positive for the satisfaction indicators. The hours worked per week decreased by 1.16 hours after the night clinic was closed. The scores for 'I maintain a good balance between work and family' and 'I am satisfied with my current work' increased by 0.5 and 0.62, respectively, from the baseline to the final measurement.

DID Model Estimates

Table 3 shows the net effect of the policy of night clinic closure based on the DID analysis. The effect of this policy on reducing the number of hours worked per week was statistically insignificant (P=0.822), whereas the policy significantly improved physicians' work–life balance and job satisfaction (p=0.019 and p<0.001, respectively).

Additionally, compared with specialists in internal medicine, those in obstetrics (p<0.001), and emergency medicine (p=0.022), reported working more hours per week. Respondents with more children were less likely to maintain a good balance between work and family (p=0.017), and single physicians (i.e., unmarried, divorced, or widowed) had lower satisfaction scores compared with married physicians (p=0.039). Salary had no significant effect on physicians' satisfaction (p=0.083).

Discussion

Although its effect on hours worked per week was insignificant, the policy of night clinic closure can clearly help physicians to maintain a balance between work and family life, and improve their job satisfaction; the policy had an overall positive effect on the intervention group.

The concept of a work–family balance was initially introduced in the 1970s in the United Kingdom. The conflict between work and family, domains that are strongly intertwined for many individuals, arises from the simultaneous pursuit of work- and family-related goals, which usually leads to feelings of pressure with regard to both[16-18]. Compared with their predecessors, increasing numbers of currently practicing physicians, especially those who are younger, value the maintenance of a work–life balance[19-21]. Indeed, physician turnover is usually driven by the conflict between work and family. As reflected in our results, overwork is a widespread phenomenon among Chinese physicians, and many studies have found that overtime work was associated with turnover among physicians[22-24]. Physicians viewed the closure of

Table 3. Adjusted effect of night-clinic closure according to the DID model

Item	Explanation of item	Model 1		Model 2		Model 3	
		Estimate	P value	Estimate	P value	Estimate	P value
DID							
Year	2017=1，2016=0	0.936	0.777	0.888	<0.001	1.358	<0.001
Group	Intervention group=1，control group=0	2.209	0.455	0.554	0.019	0.842	0.002
Year x group	Interaction item	-0.420	0.822	-0.443	0.003	-0.607	<0.001
Control item							
Monthly salary	1:<=5000，2:5001–10000, 3:10001–20000, 4:>20000	-0.022	0.978	-0.090	0.155	-0.125	0.083
Gender	male=1，female=2	-0.582	0.549	-0.098	0.204	-0.029	0.740
Age		0.111	0.420	0.010	0.400	0.020	0.1312
Years in practice		-0.022	0.877	-0.015	0.173	-0.020	0.108
Educational background	Bachelor's and below=1，Master's=2, Doctorate=3	2.197	0.004	-0.041	0.493	0.095	0.172
Academic rank	Resident=1, Attending=2, Chief=3	-2.316	0.009	0.031	0.667	0.016	0.847
Management position	Yes=1，No=2	-0.926	0.578	-0.139	0.295	-0.265	0.078
Marital status	Married=1，Single=2	-1.001	0.427	0.028	0.783	0.239	0.039
Number of children		0.332	0.694	-0.161	0.017	0.030	0.702
Department	Ref, internal medicine						
Surgery		0.218	0.859	0.173	0.078	0.012	0.915
Obstetrics		6.546	<0.001	-0.006	0.968	0.214	0.184
Pediatrics		1.955	0.546	-0.176	0.496	-0.107	0.716
Emergency		5.179	0.022	0.259	0.150	0.171	0.408
Chinese traditional medicine		1.748	0.367	0.148	0.337	0.245	0.161
others		-3.888	0.005	0.290	0.008	0.297	0.018

Model 1 is for physicians hours worked per week; Model 2 is for work–family balance; Model 3 is for job satisfaction

night clinics as a tangible action that reduced the conflict between work and family, even though the policy led to only a minor decrease in hours worked per week. Indeed, this policy was associated with higher levels of job satisfaction.

We found that closing the night clinic did not fully realize its primary aim of reducing physicians' workload. Possible explanations for this include that physicians used their newly available time for research and teaching, which are also highly valued among physicians[25-27]. Indeed, the sampled hospitals were tertiary teaching hospitals located in Beijing, and these have substantial research and teaching requirements for participating physicians. As night clinics account for only a small proportion of physicians' clinical responsibilities, their closure had no significant effect on workload. Given that night clinic closure was not sufficient to reduce the workload of physicians, other policies are needed. Additionally, compared with their colleagues in internal medicine, obstetricians and emergency physicians reported more hours worked per week. The demand for obstetricians has increased as a result of the Chinese government replacing the one-child policy with one that encourages couples to have two children. The shortage of emergency physicians is a common issue worldwide that is attributed to the frequent night shifts involved in this specialty [28]. Policies that encourage physicians to specialize in obstetrics and emergency medicine may help reduce the workload of current practitioners.

Considerable research has shown that physician satisfaction is related to patients' satisfaction and the quality of healthcare services, while physician burnout can lead to difficulties with retention [29-33]. We found that closing night clinics can enhance the work–family balance and improve physician satisfaction. Considering the importance of the latter, as a policy, night clinic closure warrants additional study and trials. Hospitals choosing to maintain their night clinic could nevertheless partially close it following full evaluation of the responsibilities of public hospitals and the workloads of physicians.

Although we found that night clinic closure had positive effects on the work–family balance and job satisfaction of physicians, the scores on both of these indicators remained low. Although the two scores increased in the intervention group after the policy was implemented, the mean score remained less than 3, out of a possible of 5. Thus, other measures are required to improve the work–family balance and satisfaction of physicians. We found that having more children was related to a worse work–family balance. Physicians with two or more children seemed to experience more family pressure than those without any children or with only one child, leading them to divert time they would otherwise devote to work to their family. We also found that the single physicians were less satisfied with their current work compared with married ones. Indeed, social support, including in the form of family activities, is an important contributor to job satisfaction[34, 35]. Hospital administrators should devote more attention to providing physicians with organizational support, including by implementing policies that facilitate the development of positive relationships and a sense of belonging at work.

Our study had several limitations. First, the sample was too small to represent physicians in all hospitals; however, our data could inform policy-making at other hospitals. Second, although we compared the results before and after policy implementation, a longitudinal study is needed to examine underlying causal relationships. Finally, physicians' satisfaction and workload may be influenced by many other factors not included in this study. These factors should be carefully examined in the near future.

Conclusion

Although the policy of closing night clinics did not significantly reduce the workload of the participating physicians, it did significantly improve their work–family balance and job satisfaction. This policy should be combined with other policies to additionally improve these parameters.

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Conflict of Interest

The authors declare no conflicts of interest.

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