

# BMJ Open Changes in Saturday outpatient volume and billings after introducing the Saturday incentive programme to clinics in South Korea: a longitudinal cohort study using claims data from 2012 to 2014

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## ABSTRACT

**Objective:** In October 2013, the South Korean government introduced an incentive programme to increase the availability of Saturday treatment at clinics, hoping to increase the role of primary care providers as gatekeepers to medical care. To the best of our knowledge, no one has yet investigated this programme's effect on overall outpatient care. Our study aims to analyse the change in Saturday outpatient volume and billings in clinics that adopted the Saturday incentive programme.

**Setting:** Our study used 3 types of data from the period October 2012 to March 2014: National Health Insurance Service (NHIS) claims data, hospital evaluation data and medical institution data.

**Participants:** These data consisted of 66 825 881 outpatient cases from 2837 clinics.

**Interventions:** Introducing the Saturday incentive programme.

**Outcome measure:** We performed a multilevel analysis that adjusted for clinic-level and outpatient-level variables to examine the difference in the percentage of Saturday outpatient volume and billings after introducing the Saturday incentive programme.

**Results:** The percentages of Saturday outpatient volume and billings were higher after introducing the programme (outpatient volume:  $\beta=2.065$ ,  $p<0.001$ ; outpatient billings:  $\beta=3.518$ ,  $p<0.001$ ). In addition, outpatient volume and billings on Friday and Saturday increased after introducing the programme, while those on weekdays, excluding Friday, decreased.

**Conclusions:** Our findings suggest that the Saturday incentive programme has affected clinic outpatient care and is a worthwhile health policy in terms of promoting primary care. Thus, it may improve healthcare accessibility and quality of care, and prevent inappropriate usage such as emergency room visits by providing patients with weekend clinic hours.

## Strengths and limitations of this study

- Our findings suggest a potential solution for promoting primary care.
- Our models considered the hierarchical nature of claims data, considering the diversity of outpatients and hospitals as much as possible.
- Data used in our study only included clinics where major treatment areas were family medicine or internal medicine.
- These results may reflect short-term effects after the adoption of the programme.

## INTRODUCTION

Over the past few decades, access to medical care in South Korea has improved with the country's gradually increasing socioeconomic status and the introduction of the National Health Insurance Service (NHIS). Thanks to these changes, many more people receive needed healthcare services, and overall health status has improved substantially. However, South Korea now faces a medical expenditure problem, driven by excessive use of healthcare resources.<sup>1 2</sup> For example, the number of doctor consultations per capita in South Korea is highest among all Organization for Economic Cooperation and Development (OECD) countries (South Korea: 13.2 per capita in year 2011, OECD average: 6.8 per capita in year 2011). This number has gradually increased in recent years (South Korea: 11.8 in year 2005, OECD average: 6.6 in year 2005). Additionally, it is expected that healthcare expenditures will continue to increase as South Korea's population ages.<sup>3</sup>

To solve these problems, many healthcare professionals have suggested that it is

necessary for primary care providers to act as gatekeepers for healthcare services, more efficiently managing healthcare expenditures.<sup>4–6</sup> However, primary care visits in South Korea have declined as a result of the appearance of large hospitals.<sup>7</sup> According to a report by the Ministry Of Health and Welfare (MOHW), the proportion of primary care expenditures relative to total healthcare expenditures has rapidly decreased (72.1% in year 2002 to 58.7% in year 2009).<sup>8</sup> Thus, the South Korean government has decided to introduce incentive programmes to make clinic visits, and hence primary care, more attractive.

In October, 2013, one such programme incentivising Saturday treatment in clinics was introduced. This government programme pays an additional 30% above the consultation fee to General practitioners (GPs) who provide healthcare services to outpatients on Saturday (9:00 to 13:00) in their clinics, including regular clinics, dental clinics and oriental clinics, to encourage people to visit primary care rather than visiting the hospital or emergency room (ER). The programme was initially introduced without copayment on additional cost; this was gradually changed (October 2013 to September 2014: no copayment; October 2014 to September 2015: 15%; and after October 2015: 30%). It was expected to influence the overall healthcare system by reducing healthcare expenditures related to ER visits for mild illness, which are often caused by insufficient time during the workweek for a patient to visit a clinic.<sup>9</sup> Previous studies in other countries have shown incentive programmes for outpatient care or primary care to be positively associated with improvement in the quality of care, but the authors also reported some concerns about moral hazards.<sup>10–13</sup> Nevertheless, to the best of our knowledge, although some studies on the impact of incentive programmes have been conducted by healthcare professionals and researchers, no studies have yet focused on differences in healthcare expenditure by day of the week after the incentive programme was introduced, especially with a focus on the clinic as the vehicle for primary care. Therefore, our study aims to analyse the difference in Saturday outpatient volume and billings in clinics participating in the Saturday incentive programme after the programme was introduced.

## MATERIALS AND METHODS

### Data source and study population

Our study used three types of data. First, we collected information on outpatient cases, using NHIS claim data from October 2012 to March 2014, from clinics that primarily specialised in internal medicine or family medicine. Of a total of 4055 clinics, we excluded those that had no Saturday outpatient cases for >1 month during the study period. To analyse the relationship with outpatient volume and billings while adjusting for clinic characteristics, we merged Health Insurance Review and Assessment (HIRA) hospital evaluation and medical

institution data with the NHIS claim data. The data used in the final analysis consisted of 66 825 882 outpatient cases from 2837 clinics.

### Variables

To evaluate the impact by the introduction of the Saturday incentive programme, the clinic-level outcome variables in our study were: (1) percentage of outpatient volume on Saturday relative to total weekly outpatient volume and (2) percentage of billings on Saturday relative to total weekly billings. The primary variable of interest was the introduction of the Saturday incentive programme. The programme was introduced by the South Korean government in October 2013, and it applies to clinics that provide primary care; the National Health Insurance Corporation (NHIC) pays an additional 30% of the cost of consultation to the clinic for Saturday visits.

We adjusted for clinic-level and outpatient-level variables when analysing the relationships between the introduction of the incentive programme and the percentages of Saturday outpatient volume and billings. Clinic-level variables consisted of region type, major treatment area (family medicine or internal medicine), grade for prescription rate of antibiotics/injectable drugs, grade for kinds of prescribed drugs, age of GP, months in operation, number of nurses, outpatient volume per month and total outpatient billings per month, to consider differences by the decision-making styles or the clinic characteristics.<sup>14</sup> Region was categorised by population size: group A consisted of metropolitan regions with more than 10 million people, such as Seoul; group B consisted of metropolitan regions with 3–10 million people; group C consisted of regions with 30 000–3 million people; and group D consisted of regions that contained <30 000 people. We used the grades for prescription rates of antibiotics/injectable drugs and kinds of prescribed drugs to reflect the percentage of outpatients prescribed antibiotics or injection drugs, to consider quality of care in each clinic. Based on the value incentive programme, these indicators represent the level for quality of care in each clinic among all clinics in South Korea, with grade 1 indicating superior quality of care. For antibiotics, grade 1=0–40%, grade 2=41–55%, grade 3=56–70%, grade 4=71–85% and grade 5=86–100%. For injectable drugs/kinds of prescribed drugs, grade 1=0–20%, grade 2=21–40%, grade 3=41–60%, grade 4=61–80% and grade 5=81–100%.<sup>15</sup> Months in operation was defined as the time since the clinic first opened and was categorised as: <6, 6 to 10, 11 to 15, 16 to 20 and >20 months prior. Outpatient-level variables included the percentages of female outpatients and elderly (>60 years of age) outpatients.<sup>16</sup> Additionally, to analyse trends before/after introducing the incentive programme, we adjusted for month as a time variable in our multilevel analysis.

### Statistical analysis

We first examined the distribution of each categorical variable, using frequencies and percentages; the average

and SD were calculated for continuous variables. Next, to compare the difference in average values for percentage of Saturday outpatient volume and billings, we performed analyses of variance. Third, to describe an analytical approach that allows the simultaneous examination of the effects of clinic-level and outpatient-level variables on clinic-level outcomes, we performed a multi-level analysis with a mixed model procedure, analysing differences in percentage of Saturday outpatient volume and billings while adjusting for clinic-level and outpatient-level variables.<sup>17</sup> In addition, we conducted a subgroup analysis according to the day of the week, to investigate daily differences in outpatient volume and billings after introducing the programme. Finally, to compare the impact of the Saturday incentive programme during weekdays, we also conducted additional analyses for coefficient of variability (CV) in proportion of outpatient volume or billing between weekdays.<sup>18</sup> All statistical analyses were performed using SAS statistical software V.9.2. All p values were two-sided and considered significant at  $p < 0.05$ .

### Ethics statement

The data used in our study consist of details of patient visits at each clinic. This study was approved by the Institutional Review Board, Yonsei University Graduate School of Public Health (2014-217). This study did not acquire informed consent from the patients, because all patient information was anonymised and de-identified prior to analysis.

### RESULTS

Our data consisted of 66 825 881 outpatient cases from 2837 clinics. Table 1 shows the general clinic characteristics of our study sample. With regard to regional characteristics, group C clinics were the most common (group A: 23.1%, group B: 28.1%, group C: 43.1%, group D: 5.7%). Internal medicine clinics (81.6%) were more common than family medicine clinics (18.4%). Clinics with grade 1 prescription rates were most common, as were clinics with grade 3 injectable drug and kinds of prescribed drug rates. The most frequent age band for GPs was 50–59 years, and the most common range for months in operation was 11–15. In terms of outpatient volume and billings per month, clinics with 1000–1999 visits per month were most common, as were clinics with KRW30 000 per month in billings. The percentages of female and elderly outpatients were 57.0% and 36.9%, respectively.

Table 2 shows the average values and SDs of our outcome variables: percentage of Saturday outpatient volume and billings. Overall, the average percentage of Saturday outpatient volume decreased from 13.53% to 13.28%, while the average proportion of Saturday billings increased from 14.00% to 15.21%, after introducing the Saturday incentive programme. Outpatient billings increased after introducing the programme for both

**Table 1** General characteristics of the clinics

Variables	N/mean	Per cent/SD
Region		
Group A	656	23.1
Group B	797	28.1
Group C	1223	43.1
Group D	161	5.7
Major treatment area		
Internal medicine	2315	81.6
Family medicine	522	18.4
Grade: antibiotic prescription rate		
1	1377	48.5
2	374	13.2
3	375	13.2
4	363	12.8
5	348	12.3
Grade: injectable drug prescription rate		
1	213	7.5
2	642	22.6
3	828	29.2
4	745	26.3
5	409	14.4
Grade: kinds of prescribed drugs		
1	298	10.5
2	471	16.6
3	821	28.9
4	687	24.2
5	560	19.7
Age of GP (years)		
≤39	80	2.8
40 to 49	1241	43.7
50 to 59	1130	39.8
60 to 69	315	11.1
≥70	71	2.5
Months in operation		
≤5	427	15.1
6 to 10	639	22.5
11 to 15	890	31.4
16 to 20	414	14.6
≥21	467	16.5
Number of nurses		
0	2081	73.4
1	482	17.0
2 to 5	234	8.3
≥6	40	1.4
Outpatient volume (per month)		
≤999	338	11.9
1000 to 1999	1366	48.2
≥2000	1133	39.9
Total outpatient billings (KRW10 000 per month)		
≤1.999	724	25.5
2.000 to 2.999	927	32.7
≥3.000	1186	41.8
Percentage of female outpatients	57.0	±5.6
Percentage of elderly outpatients	36.9	±15.8
Total	2837	100.0

GP, general practitioner.

major treatment areas, though total billings for family medicine were higher than for internal medicine; there was no significant difference between the two in

**Table 2** Mean Saturday outpatient volume and billings before and after the introduction of the Saturday incentive programme

Variables	Percentage of Saturday outpatient volume Over total outpatient volume					Percentage of Saturday outpatient billings Over total outpatient billings				
	Before		After		p Value	Before		After		p Value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Region										
Group A	13.49	±3.62	13.09	±3.07	0.0489	14.05	±3.83	15.10	±3.59	0.0746
Group B	13.88	±3.08	13.63	±2.63		14.36	±3.29	15.59	±3.11	
Group C	13.46	±3.13	13.28	±2.63		13.93	±3.40	15.22	±3.17	
Group D	12.62	±2.73	12.37	±2.43		12.66	±2.97	13.78	±2.87	
Major treatment area										
Internal medicine	13.42	±3.21	13.14	±2.71	0.0896	13.94	±3.48	15.08	±3.25	0.0001
Family medicine	14.00	±3.23	13.86	±2.81		14.24	±3.37	15.73	±3.21	
Grade: antibiotic prescription rate										
1	13.41	±3.27	13.15	±2.79	0.8537	13.90	±3.50	15.08	±3.32	0.8977
2	13.48	±3.09	13.31	±2.60		13.97	±3.37	15.26	±3.13	
3	13.71	±3.07	13.45	±2.60		14.16	±3.32	15.38	±3.11	
4	13.64	±3.40	13.32	±2.86		14.06	±3.54	15.24	±3.30	
5	13.78	±3.15	13.53	±2.68		14.21	±3.42	15.45	±3.18	
Grade: injectable drug prescription rate										
1	13.47	±3.51	13.21	±2.95	0.9758	13.99	±3.72	15.26	±3.45	0.9855
2	13.59	±3.24	13.33	±2.73		14.15	±3.53	15.33	±3.32	
3	13.52	±3.26	13.30	±2.78		14.02	±3.50	15.23	±3.31	
4	13.52	±3.17	13.27	±2.70		13.94	±3.35	15.15	±3.16	
5	13.53	±3.07	13.24	±2.65		13.84	±3.30	15.06	±3.07	
Grade: kinds of prescribed drugs										
1	13.21	±3.46	12.99	±3.07	0.8134	13.61	±3.75	14.70	±3.73	0.1341
2	13.49	±3.37	13.28	±2.84		13.93	±3.61	15.25	±3.31	
3	13.62	±3.17	13.41	±2.68		14.12	±3.38	15.41	±3.17	
4	13.68	±3.18	13.38	±2.67		14.20	±3.40	15.39	±3.13	
5	13.42	±3.08	13.13	±2.63		13.84	±3.31	14.92	±3.13	
Age of GP (years)										
≤39	13.76	±3.30	13.62	±2.88	0.6081	14.19	±3.63	15.18	±3.44	0.6440
40 to 49	13.72	±3.20	13.48	±2.73		14.22	±3.47	15.41	±3.28	
50 to 59	13.59	±3.20	13.35	±2.67		14.05	±3.40	15.31	±3.15	
60 to 69	12.77	±3.32	12.47	±2.87		13.20	±3.48	14.42	±3.34	
≥70	12.42	±3.37	11.87	±2.82		12.61	±3.54	13.65	±3.28	
Months in operation										
Up to 5	13.69	±3.38	13.38	±2.92	0.6423	14.32	±3.79	15.28	±3.55	0.0413
6 to 10	13.60	±3.31	13.38	±2.85		14.08	±3.53	15.29	±3.38	
11 to 15	13.73	±3.17	13.53	±2.65		14.15	±3.35	15.46	±3.13	
16 to 20	13.50	±3.16	13.23	±2.69		13.93	±3.35	15.12	±3.17	
21+	12.94	±3.14	12.61	±2.61		13.36	±3.34	14.61	±3.09	
Number of nurses										
0	13.60	±3.25	13.32	±2.78	0.1121	14.08	±3.48	15.34	±3.25	0.0249
1	13.66	±3.21	13.39	±2.67		14.22	±3.44	15.38	±3.17	
2 to 5	12.94	±3.10	12.87	±2.65		13.18	±3.33	14.24	±3.26	
6+	12.14	±2.76	12.36	±2.64		11.98	±2.81	12.42	±2.96	
Outpatient volume (per month)										
≤999	13.45	±3.77	13.16	±3.21	0.7139	13.90	±4.18	15.01	±3.91	0.5191
1000 to 1999	13.66	±3.25	13.40	±2.76		14.18	±3.48	15.38	±3.29	
≥2000	13.41	±3.04	13.19	±2.59		13.82	±3.22	15.07	±3.01	
Total outpatient billings (KRW10 000 per month)										
≤1.999	13.73	±3.55	13.41	±3.04	0.2584	14.18	±3.80	15.48	±3.54	0.0371
2.000 to 2.999	13.74	±3.20	13.47	±2.66		14.27	±3.41	15.54	±3.11	
≥3.000	13.26	±3.05	13.07	±2.62		13.70	±3.30	14.80	±3.16	
Total	13.53	±3.24	13.28	±2.75		14.00	±3.47	15.21	±3.26	

GP, general practitioner.

outpatient volume. Also, when analysed by months in operation, average outpatient billings increased after introducing the incentive programme, with recently opened clinics displaying a stronger trend. These relationships were also analysed in terms of average Saturday outpatient billings relative to total outpatient billings. Clinics with lower total outpatient billings had higher percentages of Saturday outpatient billings.

Table 3 shows the results of our multilevel analysis assessing the difference in percentages of Saturday outpatient volume and billings after introducing the Saturday incentive programme, while adjusting for clinic-level and outpatient-level characteristics. Percentage of Saturday outpatient volume was higher after introducing the programme ( $\beta=2.065$ ,  $p<0.001$ ). The number of months before the programme was introduced at a clinic was associated with higher Saturday outpatient volume, and the number of months after introducing the programme was inversely associated with Saturday outpatient volume. The percentage of Saturday outpatient volume was higher for group B than for group A clinics, and group D clinics had lower volume than group A clinics. Also, family medicine clinics had a greater percentage of Saturday outpatient volume than did internal medicine clinics (family medicine:  $\beta=0.337$ ,  $p<0.05$ ; ref=internal medicine). With regard to antibiotic prescription rates, grade 5 clinics had higher Saturday outpatient volume than did grade 1 clinics. GP age was also associated with Saturday outpatient volume ( $\leq 39$  years=ref; 40–49 years:  $\beta=-0.096$ ,  $p=0.6954$ ; 50–59 years:  $\beta=-0.139$ ,  $p=0.5866$ ; 60–69 years:  $\beta=-0.631$ ,  $p<0.05$ ;  $\geq 70$  years:  $\beta=-1.045$ ,  $p<0.05$ ). Clinics with billings of KRW $>30\,000$  per month had a higher percentage of Saturday outpatient volume. Finally, a higher percentage of female patients was positively associated with Saturday outpatient volume ( $\beta=0.036$ ,  $p<0.001$ ), while the percentage of elderly outpatients was inversely associated with percentage of Saturday outpatient volume ( $\beta=-0.020$ ,  $p<0.001$ ).

Similar to the results for Saturday outpatient volume, Saturday outpatient billings were higher after introducing the incentive programme ( $\beta=3.518$ ,  $p<0.001$ ). Likewise, the results for months before/after introducing the programme, regional characteristics and antibiotic prescription grades, were all similar to those for Saturday outpatient volume. The percentage of Saturday outpatient billings was higher for clinics with a GP $\geq 70$  years of age than those with a younger GP. Also, a higher percentage of female outpatients was positively associated with Saturday outpatient billings ( $\beta=0.045$ ,  $p<0.001$ ). However, the percentage of elderly patients was inversely associated with the percentage of Saturday outpatient billings ( $\beta=-0.029$ ,  $p<0.001$ ).

We also performed a subgroup analysis by day of the week, to investigate daily differences in outpatient volume and billings after introducing the programme. Outpatient volume on Friday and Saturday increased after introducing the programme, while volume on weekdays, excluding Friday, decreased. Similarly,

outpatient billings for Friday and Saturday increased, while billings on non-Friday weekdays decreased (figures 1 and 2). Furthermore, we conducted additional analyses for CV in proportion of outpatient volume or billing during weekdays, to identify whether the Saturday incentive programme had positive association with distribution of outpatient care during weekdays. Based on the results, there was positive association with even distribution between weekdays after introduction of the Saturday incentive programme (CV for outpatient volume, after introducing programme= $\beta$ :  $-5573$ ,  $p<0.001$ ; CV for outpatient billing, after introducing programme= $\beta$ :  $-5.123$ ,  $p<0.001$ ).

## DISCUSSION

To investigate the impact of the Saturday programme on outpatient usage, we analysed the difference in outpatient visits after the programme was introduced, focusing on Saturday outpatient volume and billings. Our results showed that the Saturday incentive programme was associated with changes in the behaviour of clinics and outpatients. Saturday outpatient volume and billings increased after the programme was adopted. Therefore, our findings indicate that the Saturday incentive programme has induced GPs to provide healthcare services in their clinics on Saturday, thus changing the daily distribution of outpatient visits, which, in the past, was concentrated on weekdays. Such changes are worthwhile from the perspective of health policy.

Although healthcare accessibility has improved in recent years, many people who require healthcare services cannot obtain them on weekdays, because work does not allow them sufficient time to visit a medical institution.<sup>19 20</sup> Accordingly, people have often visited the ER on weekends as an alternative means of obtaining healthcare, despite experiencing only mild illness.<sup>9</sup> Such health-seeking behaviours have continuously increased healthcare expenditures in South Korea. Thus, the improved accessibility provided by the Saturday incentive programme could reduce the unmet need for weekend clinic hours in South Korean workers.

However, there may be possible unintended effects such as moral hazards or physician-induced demand by the introduction of the Saturday incentive programme, as seen in some other financial incentive programmes. Nevertheless, continued consideration must be given to improving South Korean healthcare via health policies such as the Saturday incentive programme. During the study period, the Saturday incentive programme increased payment for clinics without increasing patient co-insurance. However, the South Korean government increased the patients' charges after October 2015. Such a change is expected to cause controversy regarding moral hazards and reduced health equity. For that reason, further studies on the effect of adding a patient charge are needed.

In addition, based on the results of our study, the CV between weekdays was decreased after introducing the

**Table 3** Results of a multilevel analysis: percentage of Saturday outpatient volume and billings before and after the introduction of the Saturday incentive programme

Variables	Percentage of Saturday outpatient volume over total outpatient volume		Percentage of Saturday outpatient billings over total outpatient billings	
	$\beta$	p Value	$\beta$	p Value
Programme				
Before introducing programme	Ref	–	Ref	–
After introducing programme	<b>2.065</b>	<b>&lt;0.0001</b>	<b>3.518</b>	<b>&lt;0.0001</b>
Time (months)				
Before introducing programme	<b>0.659</b>	<b>&lt;0.0001</b>	<b>0.662</b>	<b>&lt;0.0001</b>
After introducing programme	<b>–0.065</b>	<b>&lt;0.0001</b>	<b>–0.068</b>	<b>&lt;0.0001</b>
Region				
Group A	Ref	–	Ref	–
Group B	<b>0.545</b>	<b>&lt;0.0001</b>	<b>0.520</b>	<b>0.0004</b>
Group C	0.175	0.1695	0.178	0.2046
Group D	<b>–0.380</b>	<b>0.0258</b>	<b>–0.693</b>	<b>0.0004</b>
Major treatment area				
Internal medicine	Ref	–	Ref	–
Family medicine	<b>0.337</b>	<b>0.0004</b>	0.129	0.2340
Grade: antibiotic prescription rate				
1	Ref	–	Ref	–
2	0.032	0.7518	0.044	0.7116
3	0.137	0.1542	0.090	0.4253
4	0.037	0.7701	–0.013	0.9253
5	<b>0.258</b>	<b>0.0183</b>	<b>0.264</b>	<b>0.0378</b>
Grade: injectable drug prescription rate				
1	Ref	–	Ref	–
2	0.124	0.4398	0.119	0.5137
3	–0.051	0.7488	–0.121	0.5020
4	–0.126	0.4357	–0.248	0.1719
5	–0.016	0.9248	–0.171	0.3723
Grade: kinds of prescribed drugs				
1	Ref	–	Ref	–
2	–0.008	0.9599	0.064	0.7268
3	0.114	0.4322	0.220	0.1861
4	0.179	0.2290	0.311	0.0684
5	0.091	0.5658	0.171	0.3499
Age of GP (years)				
$\leq 39$	Ref	–	Ref	–
40 to 49	–0.096	0.6954	0.141	0.6251
50 to 59	–0.139	0.5866	0.082	0.7829
60 to 69	<b>–0.631</b>	<b>0.0295</b>	–0.396	0.2392
$\geq 70$	<b>–1.045</b>	<b>0.0052</b>	<b>–0.989</b>	<b>0.0212</b>
Months in operation				
$\leq 5$	Ref	–	Ref	–
6 to 10	0.136	0.2954	0.079	0.5976
11 to 15	<b>0.266</b>	<b>0.0283</b>	0.207	0.1360
16 to 20	0.070	0.6338	0.026	0.8770
$\geq 21$	–0.202	0.2206	–0.217	0.2497
Number of nurses in clinic				
0	Ref	–	Ref	–
1	0.016	0.8639	0.019	0.8566
2 to 5	<b>–0.313</b>	<b>0.0198</b>	<b>–0.759</b>	<b>&lt;0.0001</b>
$\geq 6$	–0.350	0.3875	<b>–1.458</b>	<b>0.0017</b>
Outpatient volume (per month)				
$\leq 999$	Ref	–	Ref	–
1000 to 1999	0.044	0.7783	0.116	0.5276
$\geq 2000$	0.057	0.7654	0.101	0.6563

Continued

Table 3 Continued

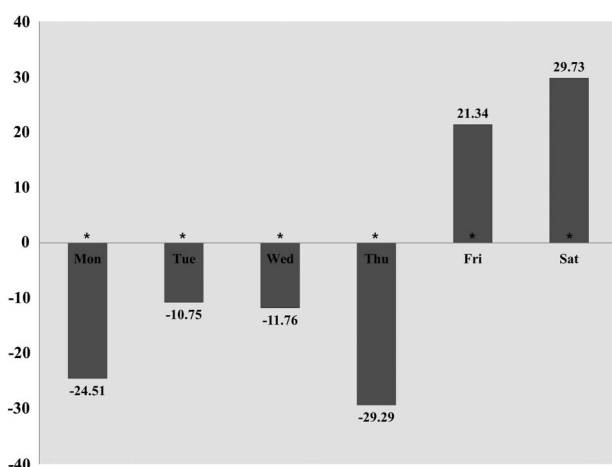
Variables	Percentage of Saturday outpatient volume over total outpatient volume		Percentage of Saturday outpatient billings over total outpatient billings	
	$\beta$	p Value	$\beta$	p Value
Total outpatient billings (KRW10 000 per month)				
≤1.999	Ref	–	Ref	–
2.000 to 2.999	–0.176	0.1159	–0.196	0.1250
≥3.000	<b>–0.684</b>	<b>&lt;0.0001</b>	<b>–0.830</b>	<b>&lt;0.0001</b>
Percentage of female outpatients	<b>0.036</b>	<b>&lt;0.0001</b>	<b>0.045</b>	<b>&lt;0.0001</b>
Percentage of elderly outpatients	<b>–0.020</b>	<b>&lt;0.0001</b>	<b>–0.029</b>	<b>&lt;0.0001</b>

Values in bold typeface are statistically significant at  $p < 0.05$ .  
GP, general practitioner.

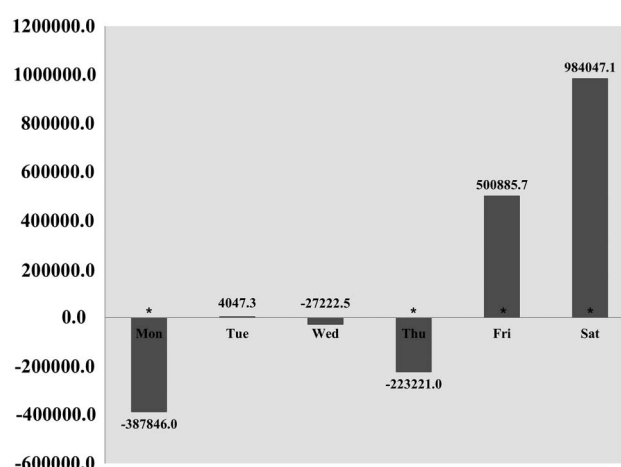
programme. Therefore, it suggested that the introduction of this programme could positively affect even distribution of outpatient cases compared with that before the programme, as well as increases in the proportion of Saturday outpatient cases, and it may also reduce the workload of healthcare providers by reducing the concentration of outpatient visits on weekdays.<sup>21</sup> This is expected to make outpatient treatment more efficient, and thus improve quality of care in South Korea. Therefore, policies such as the Saturday incentive programme could be helpful in managing healthcare quality and expenditures in South Korea.<sup>22</sup>

Our study has several strengths. First, the data used in our study included nationwide outpatient clinic cases from before and after the introduction of the programme. Thus, our findings are generalisable to South Korea as a whole, and would be helpful in establishing health policies and revising established health policies to improve efficiency. Second, we used multilevel modelling to adjust for outpatient-level and clinic-level characteristics.<sup>23 24</sup> In our study, the percentage of female/elderly outpatients was related to healthcare expenditures. Given these results, it may be possible to create policies that

differ based on outpatient characteristics. Our study also has several limitations. First, the data used in our study only included clinics where major treatment areas were family medicine or internal medicine. Thus, our findings cannot be applied to other types of clinics. Second, we could not have access to outpatient care details, such as diagnoses, type of care, etc, because these data were not present in our data set. Thus, it would be desirable to conduct additional studies with more detailed data. Third, the number of months that elapsed before and after the incentive programme was adopted was positively and negatively associated with outpatient visits, respectively, in our study. However, it was difficult to interpret these findings. These results may reflect short-term effects after the adoption of the programme; however, more detailed, long-term analyses are required to explore this finding. Fourth, we only considered clinic outpatient visits, because the data used in this study only included the information about outpatient cases rather than overall information such as ER visits or inpatient care. For that reason, our findings could not consider the healthcare usage through ER visits or hospitalisation. Also, it is difficult to determine whether the incentive



**Figure 1** Changes in outpatient volume by day of the week after introducing the Saturday incentive programme. Results of multilevel analysis adjusted for clinic-level and outpatient-level characteristics. \* $p < 0.05$ .



**Figure 2** Changes in outpatient billings by day of the week after introducing the Saturday incentive programme. Results of multilevel analysis adjusted for clinic-level and outpatient-level characteristics. \* $p < 0.05$ .

programme was effective at reducing healthcare expenditures by facilitating primary care provision, because it has introduced an element of moral hazard into the use of healthcare. Therefore, detailed analyses of the effect of introducing the programme, including factors such as hospital, inpatient care or ER visits, are needed in the future. Fifth, we could not consider the impact of changes in copayment for outpatient care after October 2014, due to limitation of data. Thus, conducting of further studies using data including the changes of copayment has to be considered in the near future. Finally, in many other studies on the introduction of new programmes, there were systematic programme evaluation methodologies such as the logical model, but we could not adopt such a model due to limitation of data, which not included any activity or process.<sup>25 26</sup> Nevertheless, our findings suggest that the Saturday incentive programme has affected clinic outpatient care and is a worthwhile health policy in terms of promoting primary care. Based on our results, healthcare professionals and health policymakers should consider additional alternatives for promoting primary care in South Korea. However, more detailed studies using bigger, more detailed datasets are needed to determine effective strategies.

## CONCLUSIONS

The introduction of the Saturday incentive programme appears to have increased the provision of outpatient care on Saturdays. Thus, it may improve healthcare accessibility and quality of care, and prevent inappropriate usage such as ER visits by providing patients with weekend clinic hours.

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