

Changes in Hospital Nursing Employment after Linking Payment to Nurse Staffing

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Abstract

This study examines the effect of a national legislation linking hospital payment to nurse staffing levels, which was established for Korean hospitals in late 1990s. There are many researches showing that financial incentives have been widely adopted to improve hospital performance. However, little is known about whether the approach is effective in increasing nurse staffing in a hospital. A decade of experience in Korean nursing payment system provides a testable case to examine the effectiveness of the approach. We used time series data on hospital-level nurse staffing and a nationwide survey of hospital nurses to compare before and after the legislation. Results show an increasing trend of RN employment after implementing the reform. The growth of nurse staffing appeared to differ depending on hospital type. Nurse employment is less likely improved in mid and small size general hospitals compared to large size tertiary hospitals. Nurse outcomes including job dissatisfaction, burnout, and intention to leave were not significantly improved among our study sample hospitals.

Keywords: Nursing workforce, Hospitals, Policy, Job satisfaction

1. Introduction

A variety of legislative efforts has attempted to increase hospitals' use of nursing resources [1], as there is compelling evidence that nurse staffing directly influences quality of care [2]. Hospital managers often argue that they try but have difficulty recruiting and retaining nurses mainly due to budget constraints. Indeed, hospitals serving primarily low-income patients reportedly show low rates of compliance to staffing regulations [3-4].

Previous studies suggest that rewarding hospitals according to their staffing levels may be an effective way to increase hospital investment in nursing resources [3, 5, 6]. For example, Harrington and colleagues found that higher Medicaid reimbursement rates lead facilities increase nursing hours [3]. However, there are many unanswered questions. For example, since raising staffing levels requires substantial capital investment, the size of incentives matters [7]. It must be sufficient for budget-constrained hospitals with low nursing resources to hire more nurses [6]. Otherwise, a discretionary nursing payment may further worsen their financial status [5]. Furthermore, the design of financial incentives should be considered to prevent unintended consequences such as raising the skill mix.

In 1999, the Korean government reformed the method that the National Health Insurance Services (NHIS) could use to pay for hospitals depending on the level of nurse

staffing. A hospital that successfully improves its staffing level gets 200% more money per patient per day than a hospital with the minimum level of nursing workforce. Furthermore, a revision of the act in 2006 added a disincentive, whereby hospitals failing to reach the threshold level had to pay penalties for their low nurse staffing. This decade of experience in South Korea provides a testable case to examine the effectiveness of financial incentives to increase nursing resources. This article examines whether the payment incentive leads hospitals to increase nurse employment and whether the response to the nursing incentive has been consistent across hospitals with various financial statuses. We also examine whether the resulting staffing changes improved nurses' working conditions.

2. Methods

2.1. Data Sources

We used two separate data sets to study the changes in nurse staffing after the implementation of the nursing payment in 1999. Time series data from the Ministry of Health and Welfare, the Patient Survey Data, were used. The analytic sample includes 756 to 1,525 hospitals each year from 1996 to 2008.

To learn whether work conditions were improved following payment reform, we used a nationwide survey of hospital RNs conducted by the Korean Health and Medical Workers Union. The survey inquired about satisfaction with work environment, burnout, and the reasons for leaving current employers, and information on demographics, education, and the work experience of hospitals' nursing workforce. The survey was distributed to 5,654 RN participants at the annual union meeting in 2010 from 79 nationwide acute care hospitals. For this study, we included data on the respondents who worked at medical-surgical and obstetrics and gynecological units, excluding the ICU, OR, and ER; this resulted in 2,387 RNs from 29 hospitals.

2.2. Measures

To investigate the effect of nursing payment reform on hospital nurse employment, we measured the number of RNs and nurse aids employed for each hospital before (1996, 1999) and after the reform (2002, 2005, 2008).

To measure whether hospital resources influence employment decisions, we examined a set of hospital-level variables including size, location, ownership, teaching status, and Case Mix Index (CMI). Hospital size was measured using both the number of licensed beds and that of patient discharges. Ownership was categorized as not-for-profit and for-profit hospitals. Teaching status was measured by the number of training doctors including interns and residents.

To examine whether nurses perceived improvements in their working conditions, we used three self-rated measures: job satisfaction, burnout, and intention to leave. Job satisfaction was rated on a 4-point Likert-type scale (1 = very dissatisfied, 2 = dissatisfied, 3 = satisfied, and 4 = very satisfied). We compared responses of very satisfied and satisfied (which received a score of 1) to those of dissatisfied and very dissatisfied (which received a score of 0). To measure the degree of burnout, we used a structured set of questionnaires termed the Maslach Burnout Inventory–Human Services Survey, which has been used and validated internationally [9-10]. This questionnaire contained nine items, each rated on a seven-point scale. In the analyses, we dichotomized the emotional exhaustion value by using the cutoff of 27, with a score above 27 being defined as high burnout. Intention to leave current employer was measured by a single item asking, "Are you intending to leave your current employer(s) within a year?"

2.3. Statistical Analysis

We first presented the trend in the mean number of RNs and assistant staff by comparing data from before the financial incentives for staffing was introduced with that from after the incentives. Next, we estimated what factors affected the changes in nurse employment using multivariate regressions. We finally conducted logistic regressions to examine whether hospital nurses had perceived improvements in their working conditions after the nursing payment reform. We controlled for the demographic characteristics of nurses and the organizational and market characteristics of employing hospitals. We used multinomial specifications in the analyses to control for the hospital effect since respondents coming from the same hospitals shared the same work conditions as well as other organizational characteristics.

3. Results

3.1. Effect on RN employment

Between 1996 and 2008, the average number of RNs per 100 bed increased by about 12%, rising from 18.51 to 20.70, while the number of doctors and nurse aides did not show any increasing trend. This increased trend after 1999 was more significant in tertiary than in secondary hospitals. Between 2005 and 2008, the increasing trend disappeared in both types.

Table 1. Descriptive Statistics of Korea's Acute Hospitals, 1996-2008

		1996		1999		2002		2005		2008	
		n	%	n	%	n	%	n	%	n	%
Hospital Type	General Hospital	275	36.38	275	32.66	275	28.86	286	22.27	303	19.87
	Hospital	481	63.62	567	67.34	678	71.14	998	77.73	1,222	80.13
Ownership*	Public	122	16.14	100	11.88	103	10.81	139	10.83	119	7.80
	Private	619	81.88	742	88.12	850	89.19	1145	89.17	1,406	92.20
Location	Capital city and neighbor	280	37.04	294	34.92	322	33.79	399	31.07	460	30.16
	Metropolitan	176	23.28	232	27.55	274	28.75	379	29.52	438	28.72
	Rural	300	39.68	316	37.53	357	37.46	506	39.41	627	41.11
Training Hospitals	Yes	246	32.54	226	26.84	210	22.04	217	16.90	199	13.05
	no	510	67.46	616	73.16	743	77.96	1067	83.10	1,326	86.95
Total		756	100.00	842	100.00	953	100.00	1284	100.00	1,525	100.00

* 1996: missing 154

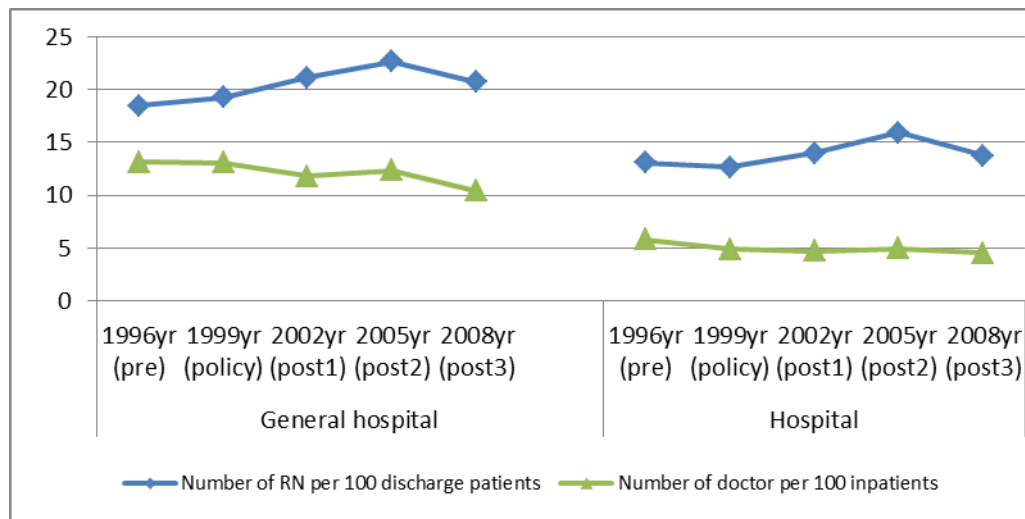


Figure 1. Average Number of Nursing Workforce in Korean Hospitals

Table 2 presents estimates of the changes in RN employment from our multiple regression. The first two columns present regression coefficients and standard errors for the number of RNs. RN employment appeared to be higher in *General Hospitals* than in *Hospitals*. The volume of patients cared for at a hospital, ownership, urban location, and teaching status were significantly associated with nurse employment.

The coefficients of policy indicators showed significant changes in hospital RN staffing, after controlling for the effects of covariates, after nursing payment reform was implemented. The coefficients of 2002, 2005, and 2008 were 0.39, 0.47, and 0.44, respectively. The interaction terms indicating the effect of policy among *Hospital*-level institutions compared to *General Hospitals* showed that *Hospitals* were not significantly likely to increase their employment of RNs responding to the payment reform.

Table 2. Estimates of the Effect of the Nursing Payment Reform on Employment of Nurses in Korean Hospitals

	Number of RNs(log)		
	Estimate	SE	p-Value
Hospital type			
General Hospital	0.442	0.060	<.0001
(referent to Hospital)			
Number of beds	0.629	0.015	<.0001
Number of patient discharges	0.423	0.009	<.0001
Ownership			
Public	0.257	0.030	<.0001
(referent to private)			
Location			
Capital city & neighbor	0.244	0.022	<.0001
Metropolitan	0.165	0.022	<.0001
(referent to rural area)			
Teaching status			
Yes	0.212	0.032	<.0001
(referent to non-teaching hospitals)			

Policy period			
(referent to 1996)			
Policy intervention (1999)	0.236	0.060	<.0001
Post intervention 1 (2002)	0.386	0.060	<.0001
Post intervention 2 (2005)	0.472	0.060	<.0001
Post intervention 3 (2008)	0.436	0.059	<.0001
Hospital type & Policy interactions			
Hospital*policy	0.034	0.072	0.640
Hospital*post intervention 1	-0.045	0.071	0.524
Hospital*post intervention 2	-0.081	0.070	0.247
Hospital*post intervention 3	-0.166	0.069	0.016
N	4902		
Adj R-Sq	0.792		

Source: KIHASA and Ministry of Health and Welfare, the Patient Survey Data, 1996-2008
SE: Standard Error

3.2. Effect on RN Satisfaction

We examined whether hospital nurses perceived improvements in their working conditions after the implementation of the nursing payment reform. Table 3 presents descriptive statistics for the nurse survey (Table 3).

Table 3. Descriptive Statistics on Hospital Nurse Survey in 2010

		n	%
Number of beds	Less than 500	407	17.05
	500-799	791	33.14
	More than 800	1189	49.81
	mean(sd)	775.57(273.60)	
Location	Capital area	1123	47.05
	Metropolitan	862	36.11
	Rural	402	16.84
Level of Nurse Staffing	Grade 1	570	24.28
	Grade 2	1096	46.68
	Grade 3	485	20.66
	Grade 4	99	4.22
	Grade 5	98	4.17
	Grade 6	0	0
Changes in staffing grade, past 5 years	No change	568	24.84
	1	1094	47.84
	2 +	625	27.33
Demographics of RNs			
Age	<25	621	26.02
	25-29	989	41.43
	>=30	777	32.55
	mean(sd)	28.52(5.60)	
Marital status	married	662	27.93
	no married	1708	72.07
Experiences (years)	<5	1302	54.55
	5-9	617	25.85
	>=10	468	19.61

	mean(sd)	5.74(5.50)	
Positions	staff nurse	2,164	91.62
	charge nurse	158	6.69
	head nurse	40	1.69
Education	3 year nursing program	1,234	52.2
	College graduate	996	42.13
	Master's or higher	134	5.67
Total		2,387	100

Source. Hospital RNs survey of the Korean Health and Medical Workers Union, 2010

Table 4 demonstrates the results of a chi-square analysis of the relationship between work conditions and staffing levels. As described at the beginning of this paper, grading hospitals with nurse staffing is a central figure of the incentive policy. For instance, when a hospital's grade moves from Grade 6 to Grade 5, it would be reimbursed 40% more value of nursing fee per patient per day. To advance the staffing grade by 1, a hospital needs to raise nurse to bed ratio by 0.5. A hospital that has improved its staffing level by 2 grades means that the hospital successfully increased staffing ratio by 1.0. Nurses working in a hospital that improved nurse staffing for the past five years were significantly less likely to report job dissatisfaction and intention to leave. About 71% of nurses were dissatisfied with jobs in hospitals where staffing level had not improved, 68% where staffing levels had increased only by one grade, and 65% where staffing had improved by two grades or more ($\chi^2 = 5.463$, $p = 0.065$). Intention to leave current employers was also higher in hospitals with no changes in staffing levels than in hospitals that had advanced their staffing grade for the past five years ($\chi^2 = 6.993$; $p = 0.032$).

Table 4. Changes in Staffing Levels and Nurse's Work Conditions in Korean Hospitals

	Job satisfaction						High burn out						Intention to leave					
	unsatisfied		satisfied		N	chi sq (p)	no		yes		N	chi sq (p)	no		yes		N	chi sq (p)
	n	%	n	%			n	%	n	%			n	%	n	%		
No change	401	70.72	166	29.28	567	5.463 (0.065)	141	25.09	421	74.91	562	4.530 (0.104)	347	63.09	203	36.91	550	6.993 (0.032)
Advanced by 1 grade	745	68.41	344	31.59	1089		285	26.46	792	73.54	1077		738	68.97	332	31.03	1070	
Advanced by 2+ grades	400	64.52	220	35.48	620		186	30.29	428	69.71	614		421	69.36	186	30.64	607	
N	1546	67.93	730	32.07	2276		612	27.16	1641	72.84	2253		1506	67.62	721	32.38	2227	

Table 5 shows the effect of the NTP on different nurses work conditions after controlling for individual nurse factors and hospital characteristics. We found that the improvement of nursing fees over the past five years was not significantly related to any measure of nurses work conditions. Current staffing levels also did not show any significant relation with job satisfaction ($p = 0.672$) or intention to leave ($p = 0.289$). However, nurses currently working in hospitals with higher staffing levels were significantly less likely report burnout (coefficient = -0.667, $p = 0.097$).

Table 5. Estimates of the Effect of the Nursing Payment Reform on Nurse's Work Conditions in Korean Hospitals

Variables	Job Satisfaction			High burn out			Intention to leave		
	OR	95% CI		OR	95% CI		OR	95% CI	
		Lower	Upper		Lower	Upper		Lower	Upper
Changes in nurse staffing grade, past 5 years (referent to no change)									
Advanced by 1 grade	0.994	0.574	1.723	1.217	0.627	2.363	1.153	0.717	1.854
Advanced by 2+ grades	0.887	0.429	1.835	1.314	0.549	3.141	1.579	0.834	2.991
Levels of nurse staffing (referent to low staffing)									
High	1.144	0.592	2.209	0.514	0.231	1.142	0.743	0.418	1.319
Explained Variance		36.7%			40.3%			66.7%	

Source: Hospital RNs survey of the Korean Health and Medical Workers Union, 2010

Note: All regression models include nurse demographics (age, marital status, years of nurse experience, position, education) and hospital characteristics (number of beds, location).

SE: Standard Error

4. Discussion

4.1. Extending the Effect of Nursing Payment Reform

This study investigates a decade of experience in South Korea linking payment to nursing resources with the aim of increasing hospital nurse staffing. We found an increasing trend of RN employment that appeared immediately following policy implementation and continuing for the first six years. However, the increasing trend appeared to disappear after 2008. Thus, the effect of financial incentives was short-lived. This may be due to the very high baseline nurse staffing levels in hospital sectors where staffing could not be increased much more (Werner *et al* 2011). These facilities had already invested a great deal in nursing resources before the nursing payment reform was introduced. Health care settings other than hospitals have lower baseline staffing and, thus, may experience larger and more prolonged improvements with financial incentives.

4.2. Considering Hospitals' Financial Status

Although effective in raising nurse employment overall in the hospital sector, our findings show that, while increases in staffing appeared in *General Hospitals*, they did not in *Hospitals*. This may be because financial incentives are less effective with hospitals that lack the resources to invest in nurse staffing (Lindrooth *et al* 2006). *Hospital*-level facilities have less than 100 licensed beds. Their operating margins reportedly are low (Park, Seo & Lee 2013). Since raising nursing staffing levels is costly for hospitals, regulatory efforts may have a smaller impact on these hospitals in poor financial shape than on general hospitals. General hospitals may be able to offer high wages and better benefits, including childcare subsidies and continuing education to attract qualified RNs. If they have already invested in human resources, they could recruit and retain nurses at low cost when facing staffing regulation. Some unknown factors inherent to hospital types such as differences in managerial capacity may be associated with the difference in compliance rates between hospital types.

Incentives would have a larger effect if they were tied to *Hospital*-level institutions. For example, it is feasible to pay larger incentives to providers with fewer financial resources because they provide a large amount of safety net care. This strategy is used in some

nursing home pay-for-performance programs where facilities caring for a disproportionate share of residents enrolled in Medicaid are eligible for large bonuses based on Medicaid payments (Werner, Konetzka & Liang 2010). However, out of the more than \$21 million NHIS paid for financial incentives in 2012, less than 13% was awarded for *Hospitals*; more than 45% was still paid to *General Hospitals*.

4.3. Investing Resources to Improve Work Conditions

In addition to measuring the effect on nursing employment, we examined whether the changes resulting from financial rewards improves nurses' working conditions. We found that nurses work conditions including job dissatisfaction, burnout, and intention to leave were not significantly improved while overall staffing increased. There was no significant difference in work environment between hospitals that were awarded financial incentives and those that were not.

At this time, there is limited evidence that Korean nursing payment reform has resulted in improvements in the quality of care provided to hospital patients. It is possible that the consistently unimproved nurse working conditions documented here will have a negative effect on the quality of care delivered to patients (Gray, Phillips 1996, Tai, Bame & Robinson 1998). Unless the nursing payment reform improves nurse satisfaction and relieves workload, nurse turnover rates may indeed rise, further harming the quality of hospital care.

Improved working conditions will draw larger numbers of nurses to the hospital workforce (DeMoro 2001). Licensed nurses who are not currently employed in hospitals could be attracted to hospital nursing work as the work environment improves. It is also possible that, if currently employed nurses are more satisfied, they may be more likely to attract new people to the field through personal communications (Buerhaus, Donelan, Norman & Dittus 2005). As a result, it might be easier for hospitals to recruit nurses because the supply of RNs will increase. Researchers and leaders in the field of nursing have expected the NTP to initiate this cycle.

4.4. Limitations

Although we controlled for the possible effects of covariates pertinent to staffing decision, one limitation of our study may come from not controlling for the effect of competition between hospitals. Hospitals located in area where there are few neighboring hospitals may be easy to hire nurses. Hospitals that located in competitive markets, however, may have difficulty to raise their staffing levels. They often have to pay more to attract nurses than hospitals with monopolistic power. Although reimbursement policies provide hospitals with incentives and motivation to increase nursing resources, whether a hospital responds to the policy may depend on labor market conditions. Future study needs to empirically investigate whether the effect of the nursing incentive varies across hospitals with various levels of competition between hospitals.

Unmeasured time shock is also a possible confound in our findings. There were many legislative efforts in the South Korean government during the early 2000s to improve hospital performance (OECD, 2012). For example, adequate use of antibiotics at hospital level began to apply for evaluating hospital performance during 2000s. Hospital administrators required to juggle priorities with competing demands for internal investment to improve hospital performance. They seemed to face few incentives to invest in nursing staff, requiring a substantial investment. Future analysis needs to control for the co-founding factors by applying a more robust estimation method.

5. Conclusions

Linking hospital nursing staffing to payment may provide hospitals with motivations and incentives to improve staffing levels. A decade of experience in Korea shows that the

approach is somewhat effective for hospitals with adequate resources to invest in nurse staffing, but less so with hospitals that lack such resources. It can be more effective in improving staffing levels, if considering those hospitals in poor financial shape.

6. Policy Recommendations

In 1999, the national insurance in South Korea began to devote significant funding to address hospitals' low nurse staffing, which accounted for \$220 million in 2012. The reform introduced in 1999 was framed in an incentive context that required hospitals to meet certain standardized criteria for staffing. Paying hospitals for improving nurse staffing and not only for achieving a high-level mandated nurse-to-patient ratio might give poorly financed hospitals both the motivations and the means to improve staffing levels.

This study provides empirical evidence that linking institution-level nurse staffing to payment is effective in improving nurse employment in the hospital sector. This approach could be adopted by policymakers with the aim of raising hospital nurse staffing or ensuring already existed mandatory staffing regulations such as minimum nurse-to-patient ratios or patient classification systems.

Our findings also suggest that financial incentives are less effective with hospitals that lack the resources to invest in nurse staffing. To be more effective, careful considerations for hospitals in poor financial shape are required when designing and implementing this approach.

Finally, we would like to emphasize that nurse outcomes including job dissatisfaction, burnout, and intention to leave were not significantly improved, while overall staffing increased. If currently employed nurses are more satisfied, they may be more likely to attract new people through personal communications. As a result, it might be easier for hospitals to recruit more nurses. Investment to improve nurse work conditions is required to increase staffing levels.

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