Impact of mass resignation of doctors on medical service delivery: An interrupted time series analysis

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Introduction

- South Korea's National Health Insurance Service (NHIS) has maintained near-universal coverage for nearly five decades, encompassing about 97% of the population[1]. The system has achieved remarkable outcomes, including a life expectancy of 83.6 years, which is more than three years higher than the OECD average, and a preventable mortality rate far below the OECD benchmark. Despite these successes, concerns about long-term sustainability have intensified. Persistent issues such as low reimbursement rates, heavy workloads, and legal risks have created deep dissatisfaction among healthcare providers, signaling potential instability in the system's workforce structure.
- In February 2024, the government announced a 65% expansion in annual medical school admissions (from 3,058 to 5,000) to address regional and essential care shortages. This unilateral policy triggered strong opposition, leading to the mass resignation of over 90% of interns and residents, which resulted in a 40% reduction in the hospital workforce. This unprecedented disruption provides a unique opportunity to evaluate its impact on healthcare delivery.
- **This study aims to assess short-term changes in medical service utilization following the 2024 resignation event, using an interrupted time series (ITS) analysis of NHIS claims data from January 2022 to July 2024.**

Methodology

- This study analyzed monthly claim data from the NHIS, South Korea's single-payer system, covering January 2022–July 2024[2]. The dataset included reimbursed prescriptions for medications and medical supplies, as well as information on sex, age group (by decade), patient type (inpatient or outpatient), and healthcare delivery level (clinic, hospital, general hospital, tertiary hospital).
- An ITS design was used to assess the impact of the 2024 mass resignation of doctors on healthcare service delivery. This quasi-experimental approach estimates both immediate (level) and gradual (slope) changes after an event while accounting for underlying trends and seasonality.
- The ITS model was fitted using a generalized least squares regression, dividing the study period into pre-resignation (Jan 2022–Jan 2024) and post-resignation (Feb–Jul 2024) phases:

$$Y_t = \alpha + \beta_1 T_t + \beta_2 E_1 + \beta_3 X_1 + \epsilon_t$$

where $Y_t$represents the monthly number of claims (millions), $E_1$the resignation event (0 = before, 1 = after), and $X_1$the time after the event. β_1 ,β_2 ,and $\beta_3$correspond to the pre-event slope, immediate level change, and post-event slope change, respectively. Analyses were performed using R v4.3.2, with P < 0.05 as the threshold for significance.

- All data were de-identified and publicly available through the **NHIS Open Data Portal**, and ethical review was waived.

Results

- The distribution of medical claims showed no significant difference in patient type between the periods before and after the February 2024 mass resignation. However, notable shifts were observed across hospital types. The proportion of prescriptions decreased in tertiary (–0.6%), general (–0.3%), and hospital-level institutions (–0.4%), while it increased in clinics (+1.3%). For medical supplies, tertiary hospitals recorded a marked decline (–6.2%), whereas clinics (+2.2%), hospitals (+2.1%), and general hospitals (+1.9%) showed modest increases <Table 1>.
- ITS analysis revealed a significant immediate reduction in medical service utilization within tertiary hospitals following the mass resignation. As shown in Figure 1, medication claims dropped by 15.5% and medical supply claims by 26.1% immediately after February 2024, indicating the acute impact of workforce disruption on high-level medical centers. No consistent gradual effects were detected across other hospital types.

Table 1. Distribution of Medical Claims by Patient Type and Hospital Level

Medical claims	Medication			Medical supplies		
Periods	2022.1 ~ 2024.1	2024.2 ~ 2024.7		2022.1 ~ 2024.1	2024.2 ~ 2024.7	
	Before (n = 3663.8 M)	After (n = 877.5 M)	P-value*	Before (n = 213.1 M)	After (n = 47.4 M)	P-value*
Patient type			0.941			0.705
Inpatient	681.2M (18.6%)	164.5M (18.7%)		146.4M (68.7%)	31.9M (67.4%)	
Outpatient	2982.5M (81.4%)	713.0M (81.3%)		66.8M (31.3%)	15.4M (32.6%)	
Hospital types			<0.001			<0.001
Tertiary Hospitals	181.9 M (5.0%)	38.6 M (4.4%)		72.5 M (34.0%)	13.2 M (27.8%)	
General Hospitals	365.2 M (10.0%)	85.6 M (9.7%)		75.9 M (35.6%)	17.8 M (37.5%)	
Hospitals	338.1 M (9.2%)	76.9 M (8.8%)		40.3 M (18.9%)	9.9 M (21.0%)	
Clinics	2778.6 M (75.8%)	676.5 M (77.1%)		24.5 M (11.5%)	6.5 M (13.7%)	

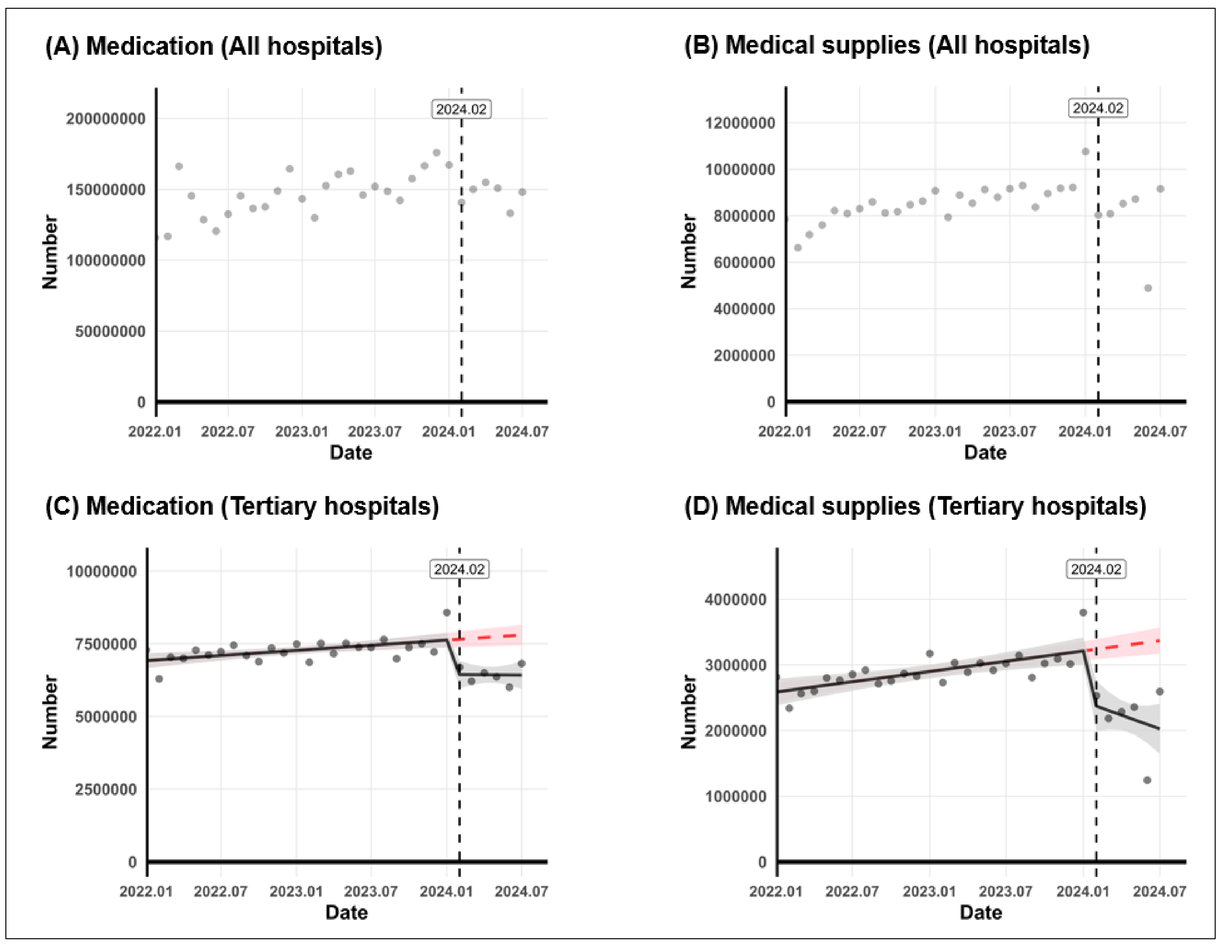

Figure 1. Time-series scatter plots of medical claims before and after the mass resignation of South Korean doctors in February 2024 according to hospital types.

Conclusion

The 2024 mass resignation of doctors in South Korea temporarily disrupted medical service delivery, with **the largest prescription declines observed in tertiary hospitals. This event highlights the healthcare system's vulnerability to sudden workforce loss.** Strengthening workforce stability and system resilience is crucial to ensure continuity of care.

References

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